

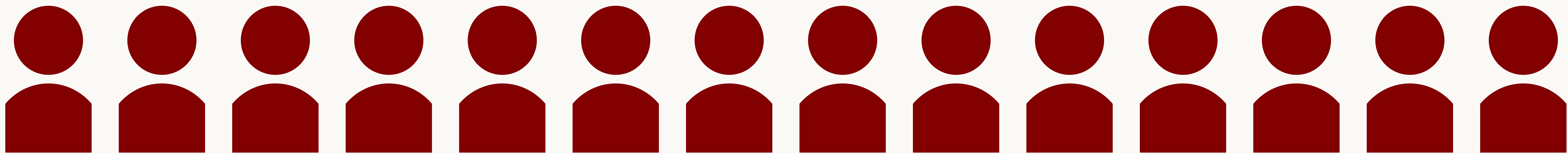
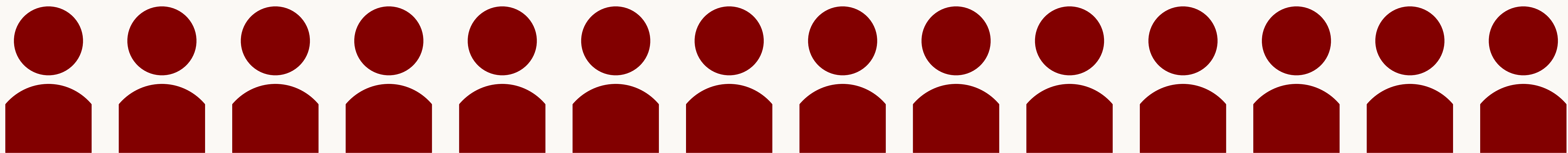
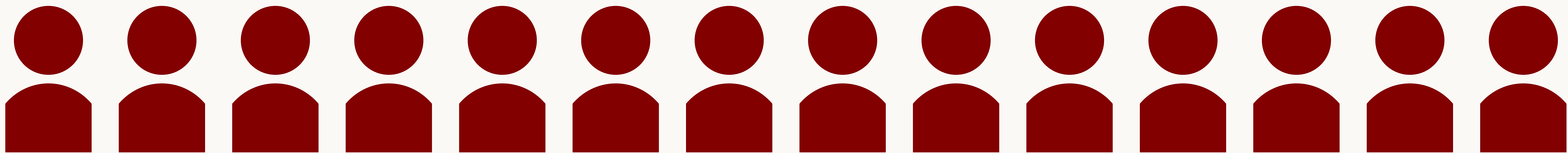
# Computation and Organization

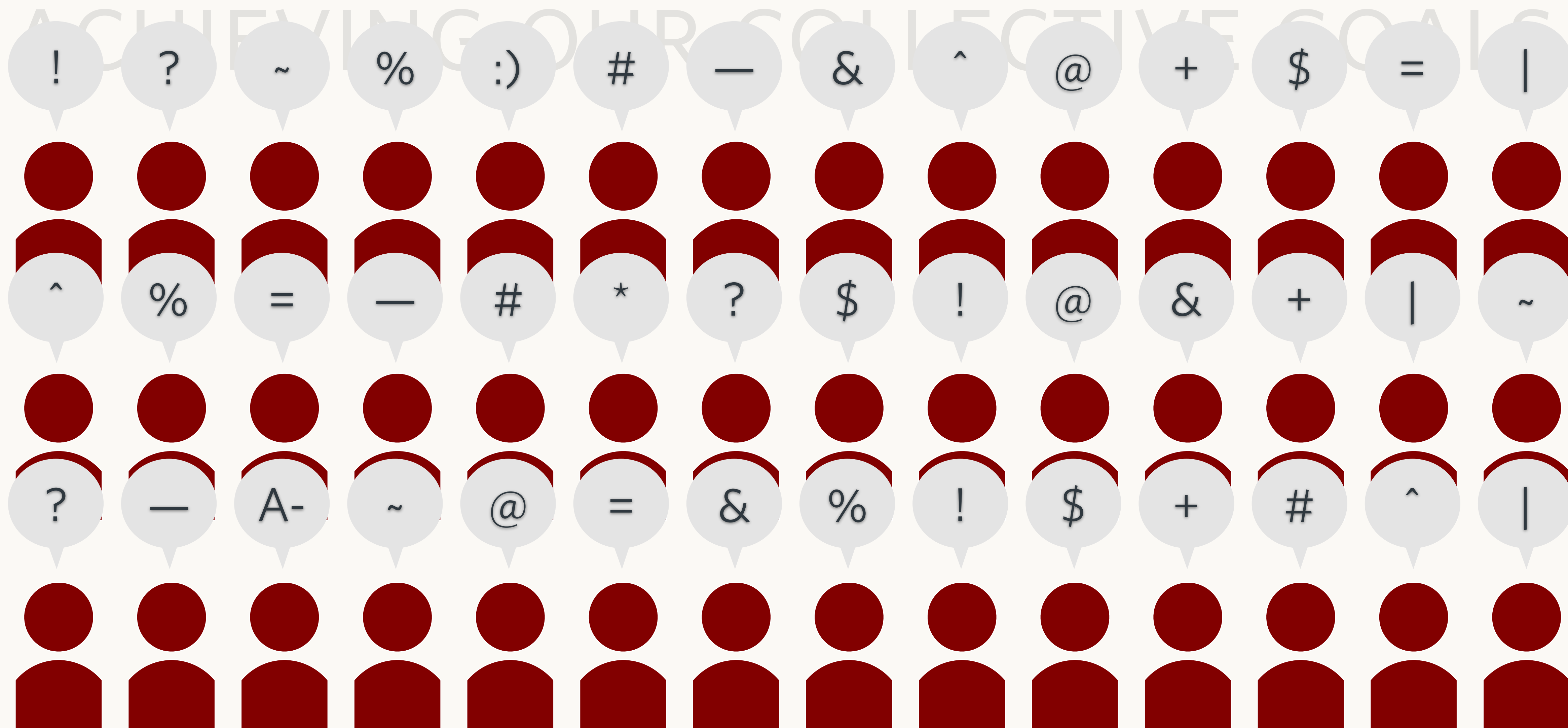
Michael Bernstein  
Stanford Computer Science

**Computation can power  
dramatically new forms of  
organization: experts in a click.**

**However, we need regulation to  
ensure that this is a positive future  
for workers.**

# ACHIEVING OUR COLLECTIVE GOALS







**COORDINATION NEGLECT: HOW LAY  
THEORIES OF ORGANIZING  
COMPLICATE COORDINATION IN  
ORGANIZATIONS**

**Out of Sight, Out of Sync: Understanding  
Conflict in Distributed Teams**

**The Mutual Knowledge Problem and Its  
Consequences for Dispersed Collaboration**

**The team scaling fallacy: Underestimating the declining efficiency of larger teams**

**Who's in Charge Here? How Team Authority Structure Shapes Team Leadership**

**Team Familiarity, Role  
Experience, and  
Performance: Evidence from  
Indian Software Services**

**The Influence of Shared Mental Models on Team Process and Performance**

**Some unintended consequences of  
job design**

**Structure and Learning in Self-Managed Teams:  
Why “Bureaucratic” Teams Can Be Better Learners**

COORDINATION NEGLECT: HOW LAY  
THEORIES OF ORGANIZING  
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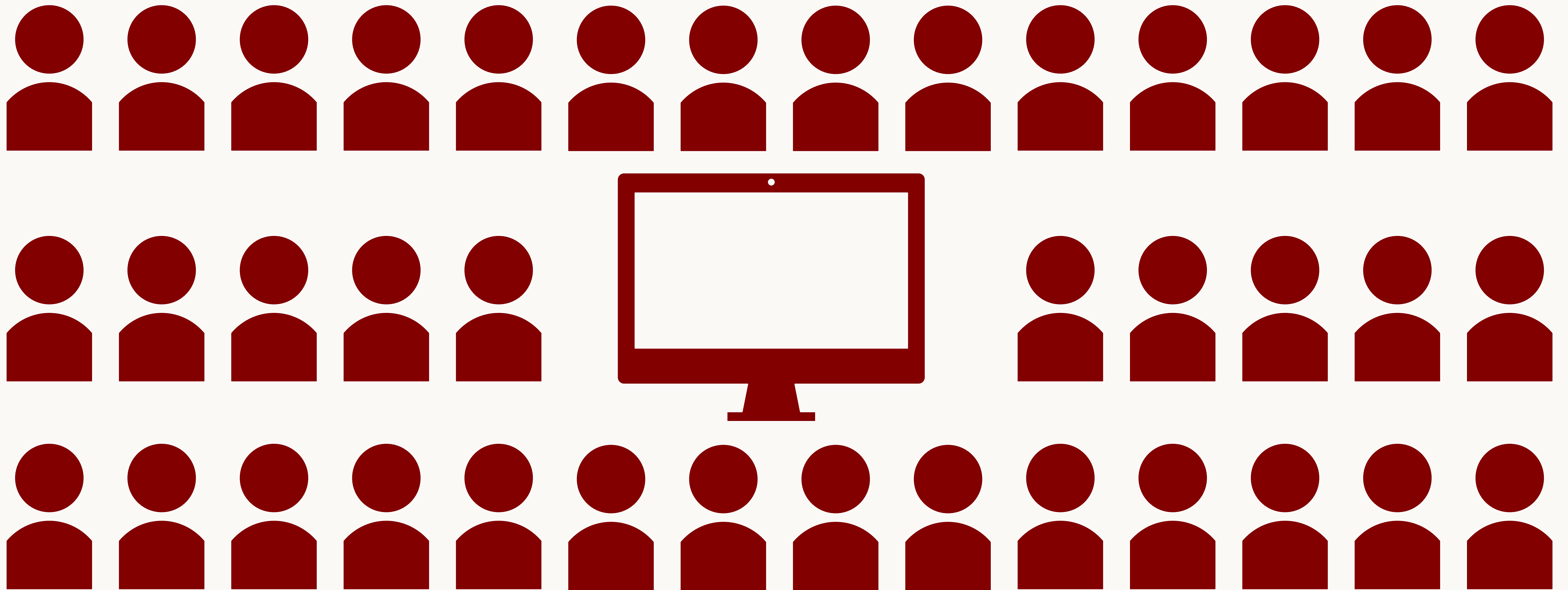
The Influence of Shared Mental Models on Team Process and Performance

Some unintended consequences of  
job design

Structure and Learning in Self-Managed Teams:  
Why "Bureaucratic" Teams Can Be Better Learners

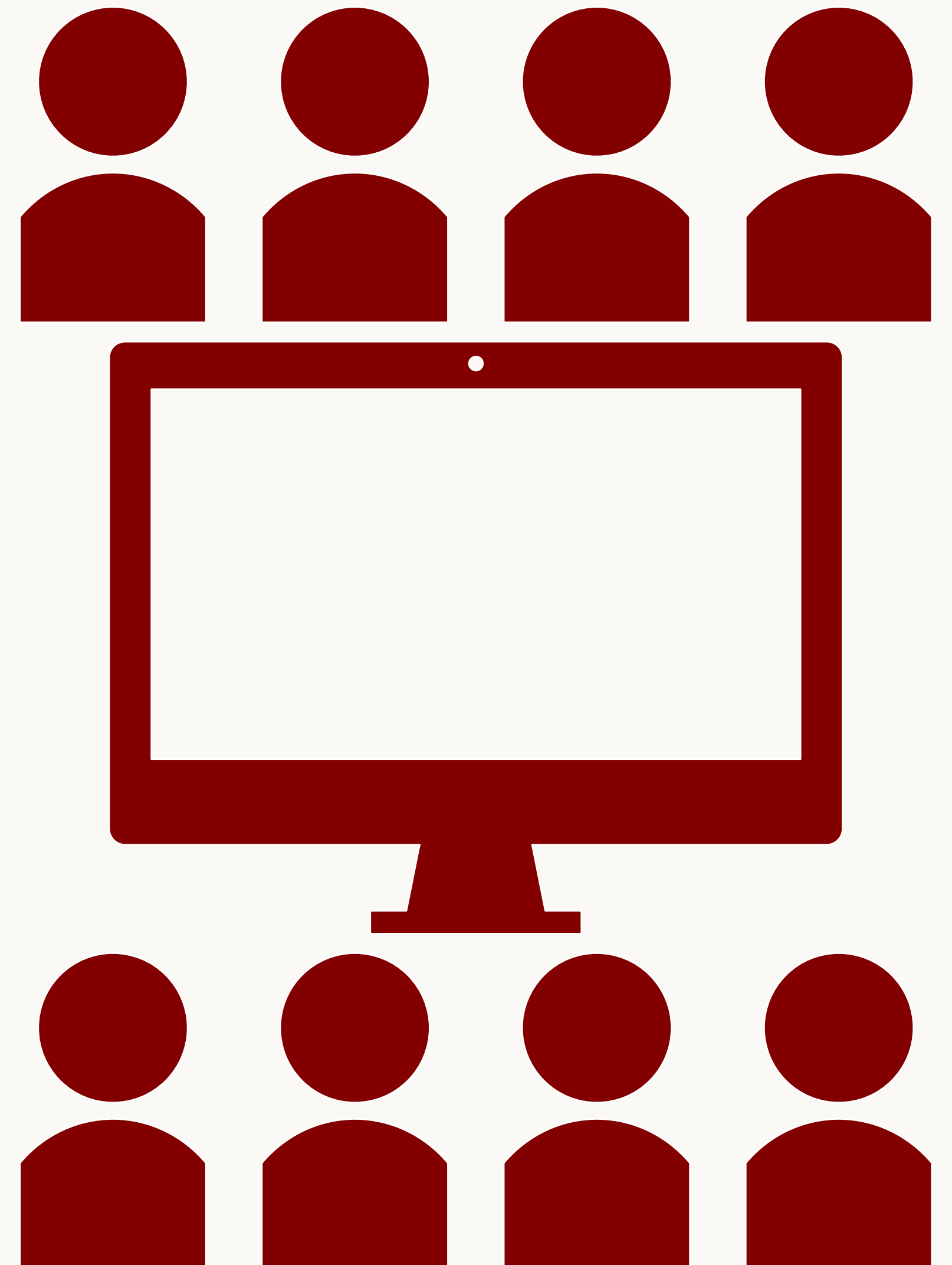
**FAILURES TO ACHIEVE OUR  
COLLECTIVE GOALS ARE RARELY  
DUE TO INSUFFICIENT SKILLS  
AND INCREASINGLY DUE TO  
FRAUGHT COLLABORATIONS.**

# HOW MIGHT COMPUTING AUGMENT US IN ACHIEVING OUR COLLECTIVE GOALS?



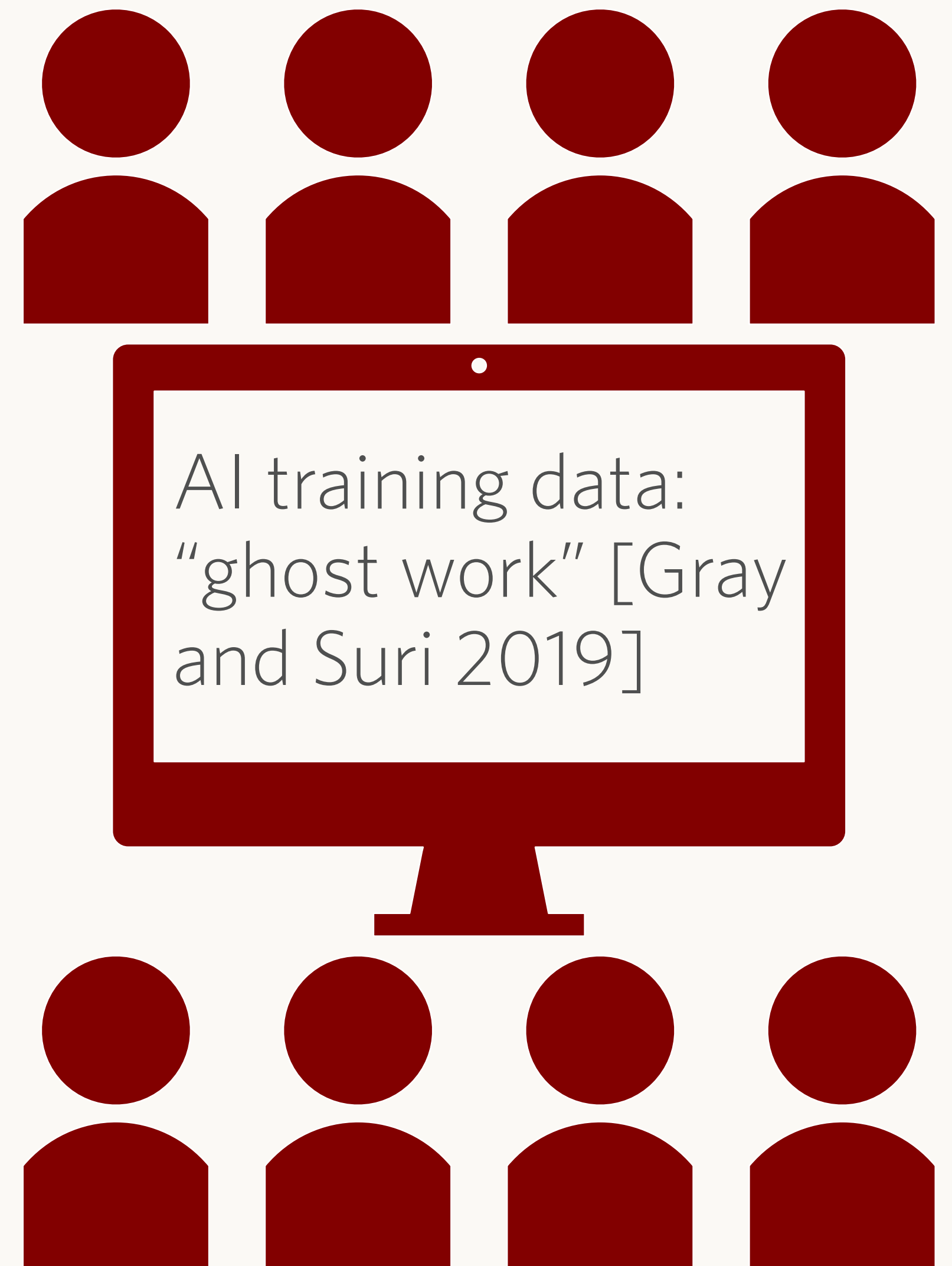
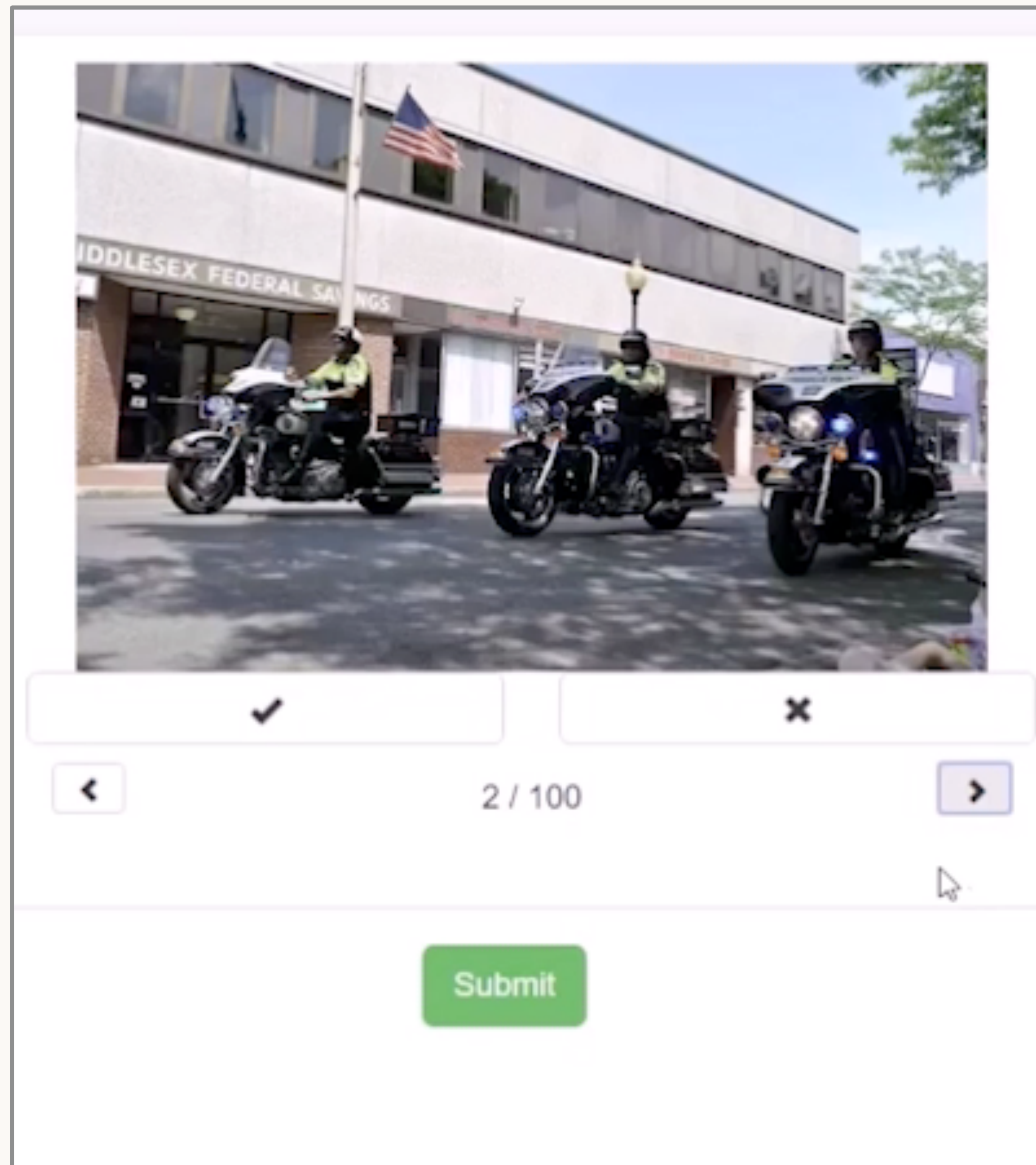
# EXPERTS IN A CLICK

Online platforms connect people who want work done with people interested in doing the work





# EXPERTS IN A CLICK



# EXPERTS IN A CLICK



[Image via Brand Fabrik]





# EXPERTS IN A CLICK

What becomes possible when nearly any expertise is available?



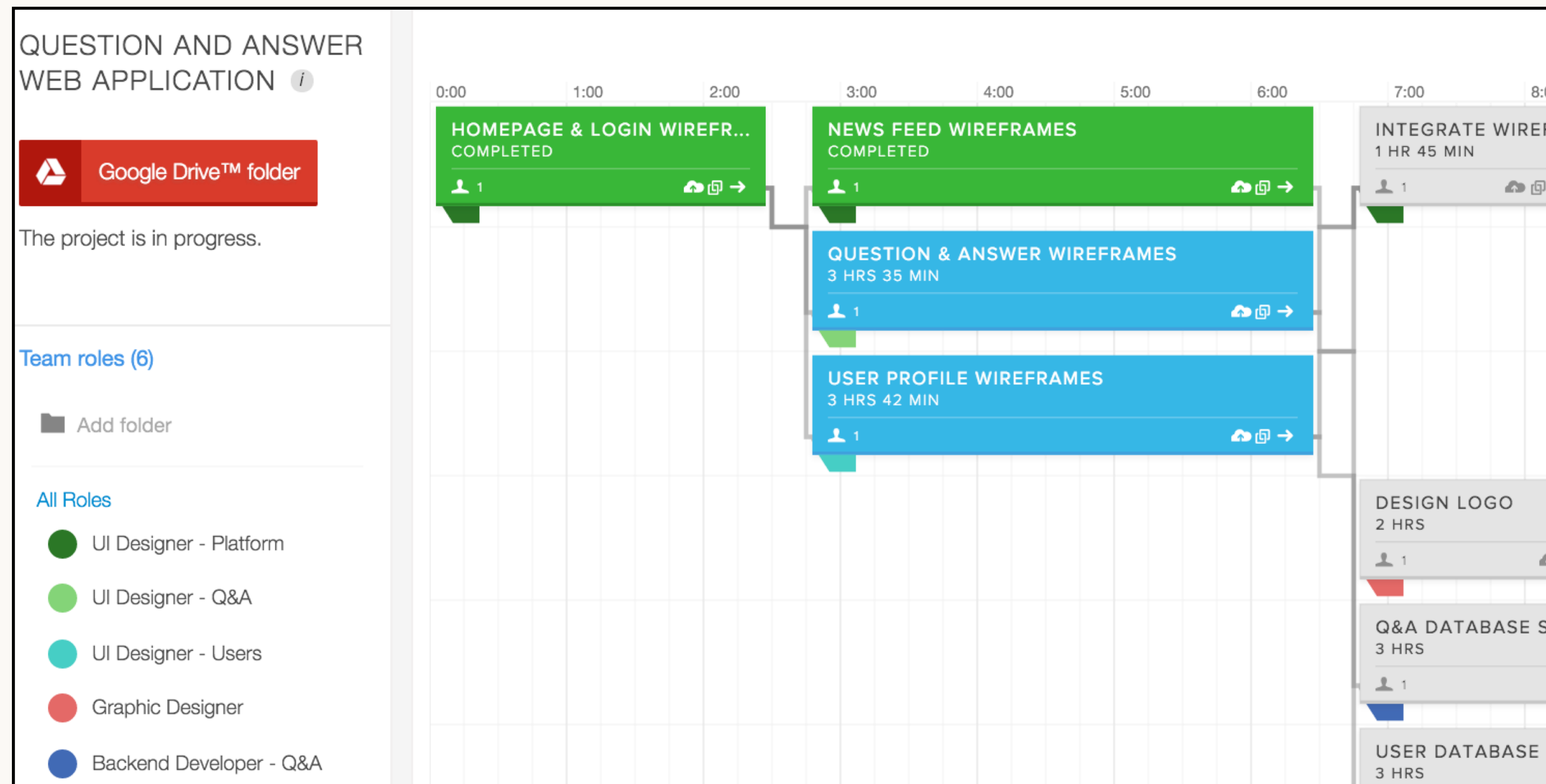
**GIGSTER**



# **Visions of computation and organization**



# ON-DEMAND FLASH TEAMS



What expertise?

When?

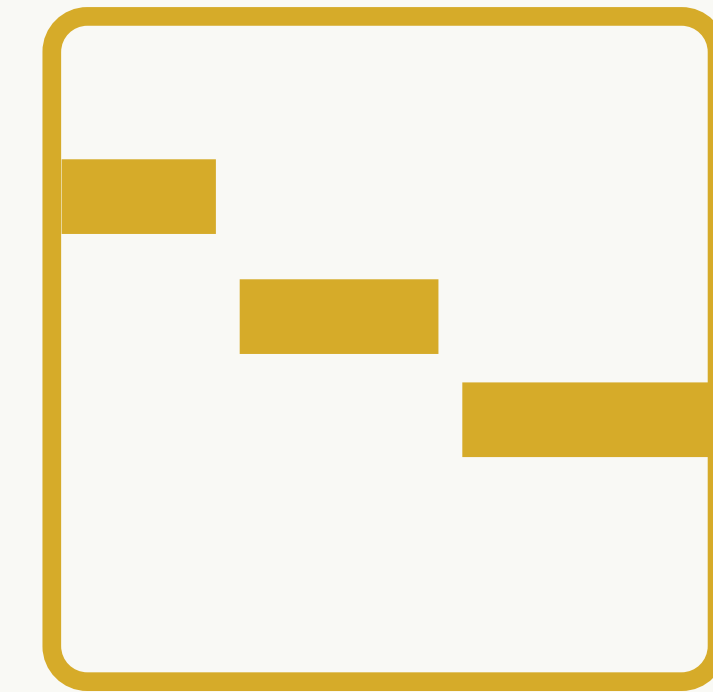
What are they doing?

How do the contributions come together?

Web platform that supports authoring, reconfiguring, and running on-demand teams of experts

[Retelny et al. 2014]

# ON-DEMAND FLASH TEAMS



# CREATION BY REQUEST

What if you wanted something that no previous team had created?



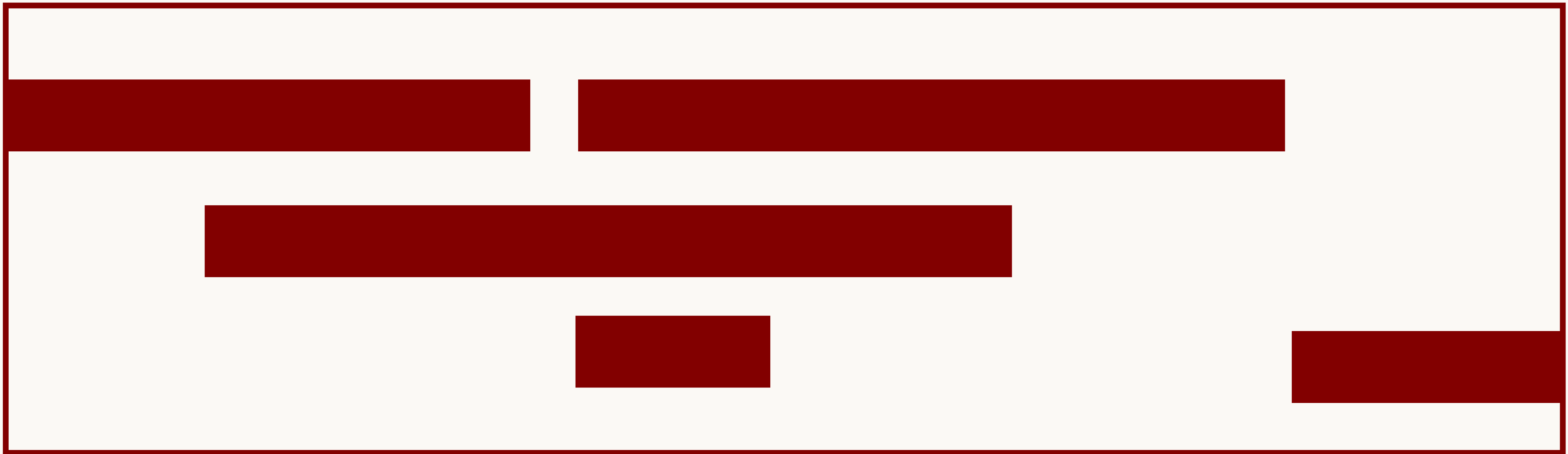
# CREATION BY REQUEST

Synthetic team created from compatible blocks from previous teams



# CREATION BY REQUEST

Synthetic team created from compatible blocks from previous teams.



**Flash organizations:  
rapidly assembled and  
reconfigurable  
organizations composed of  
online collaborators**

[Valentine et al. 2017]

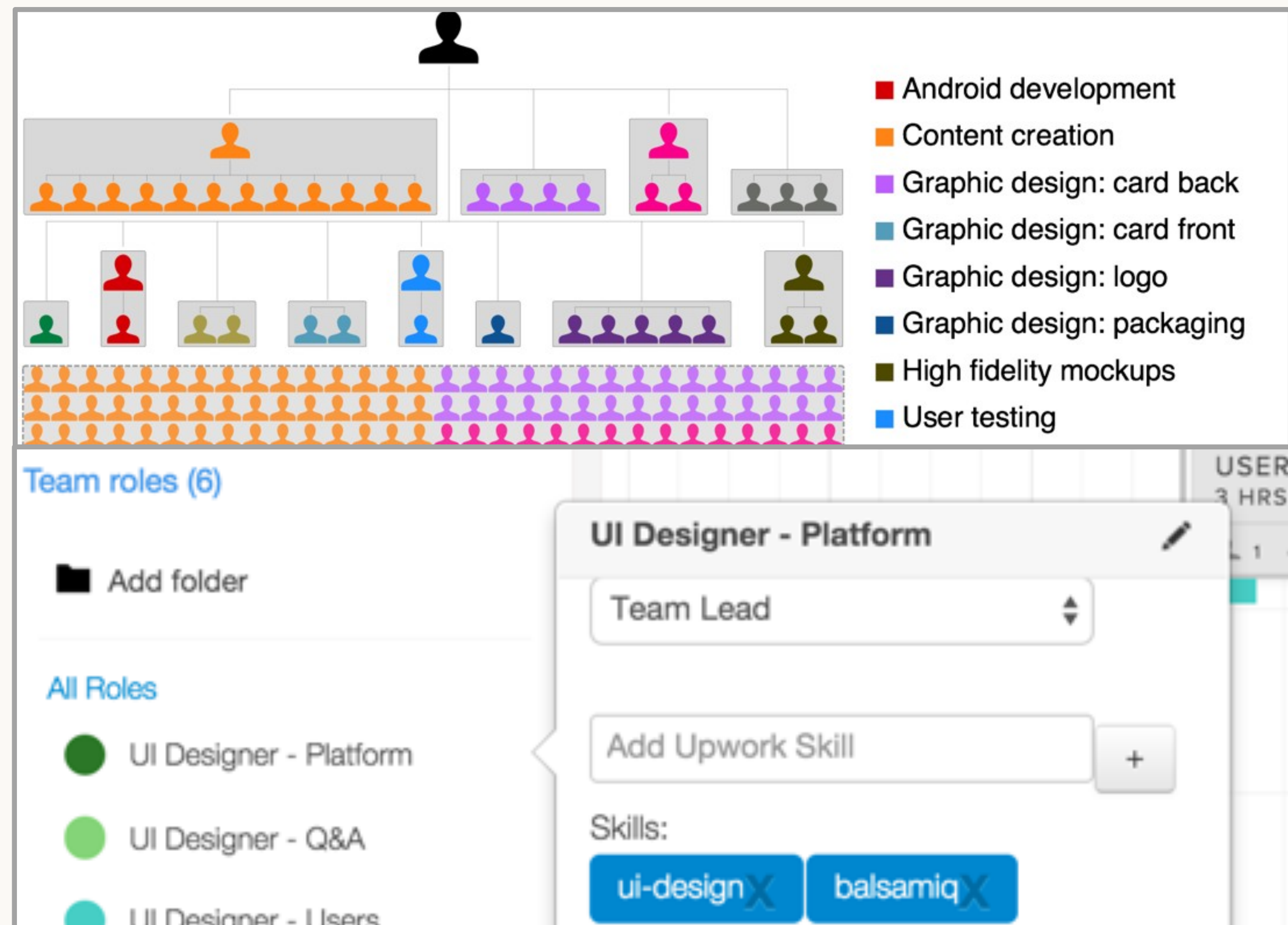


# COMPUTATIONAL ORGANIZATIONAL STRUCTURES

**Roles:** parametrize required expertise

**Teams:** groups of workers with shared goal

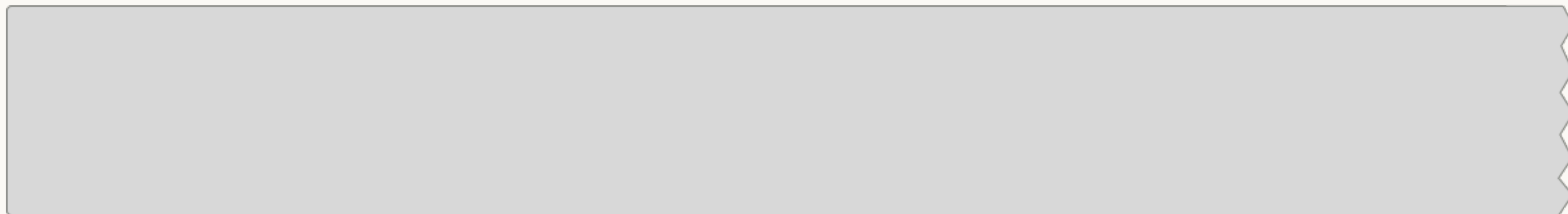
**Hierarchy:** nested roles that determine decision rights



# EMS TRAUMA REPORT



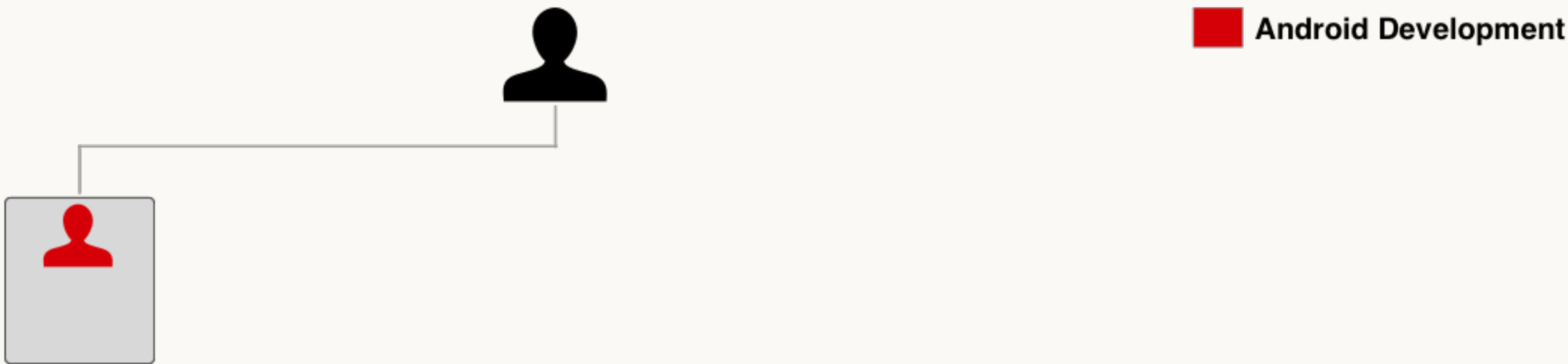
← Medical resident, no experience managing  
or building software



Task timeline

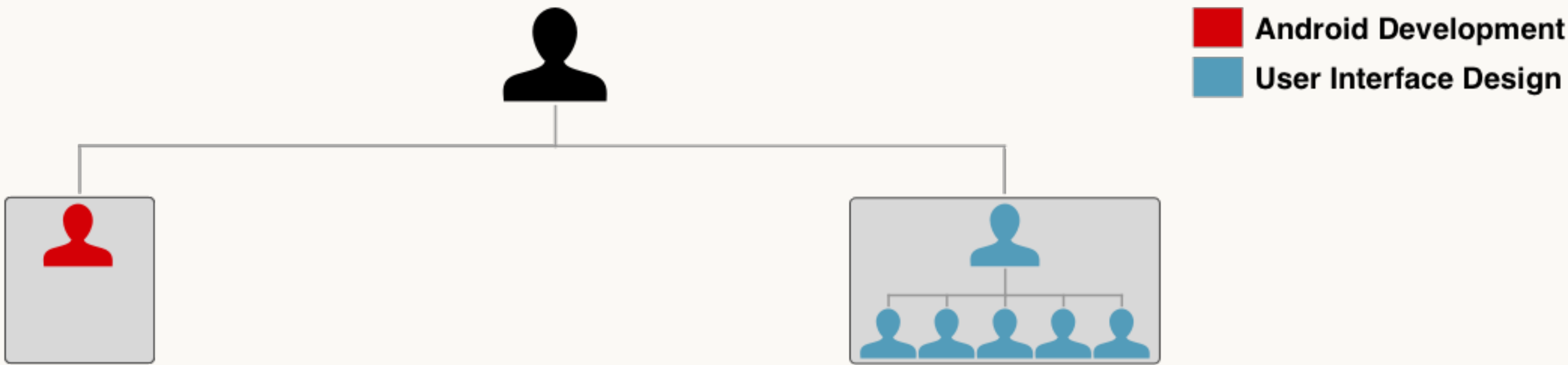


# EMS TRAUMA REPORT



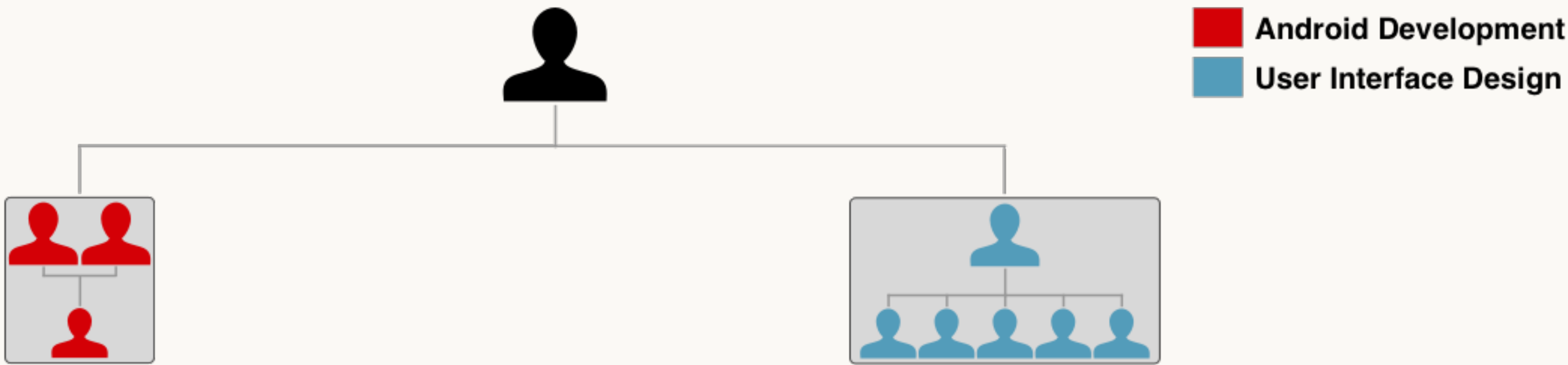
Task timeline

# EMS TRAUMA REPORT



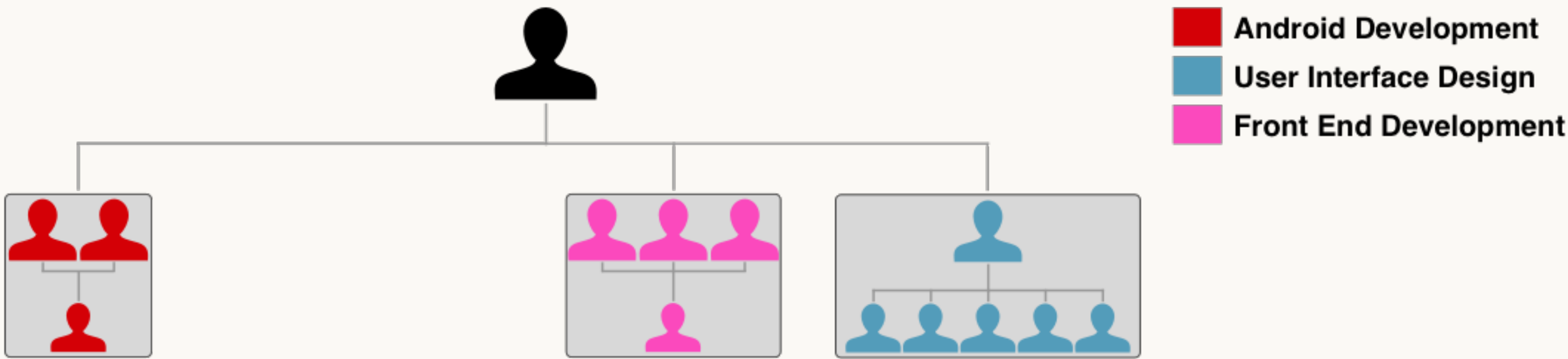
Task timeline

# EMS TRAUMA REPORT



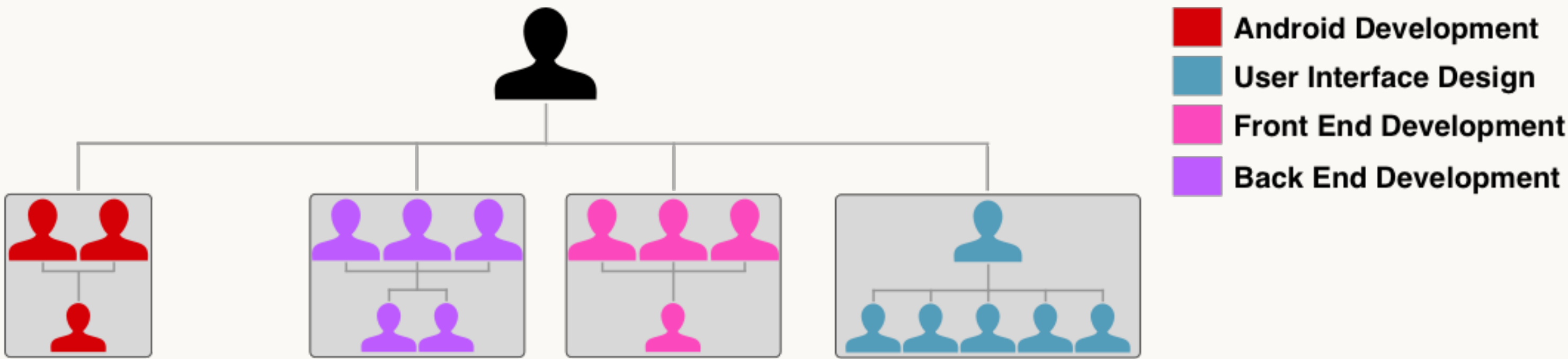
Task timeline

# EMS TRAUMA REPORT



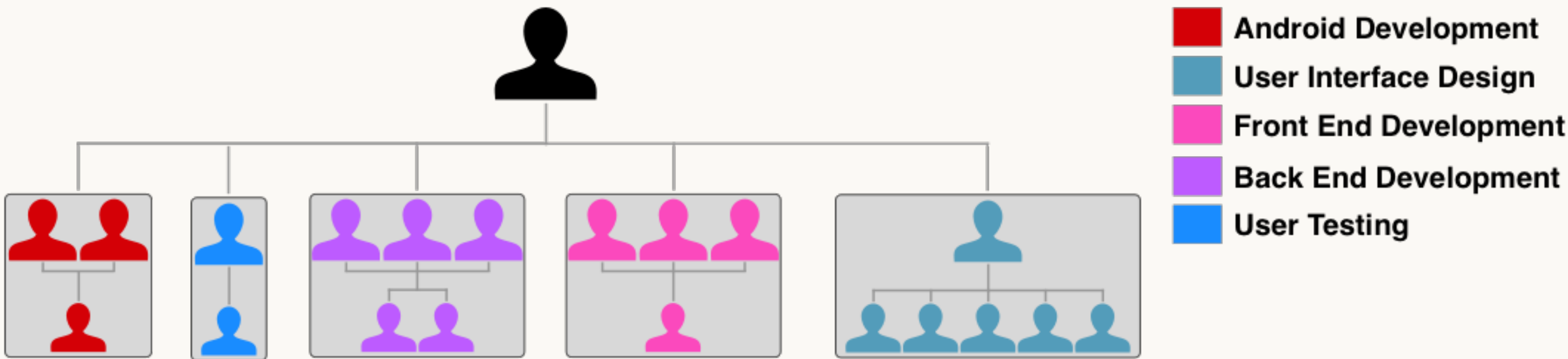
Task timeline

# EMS TRAUMA REPORT



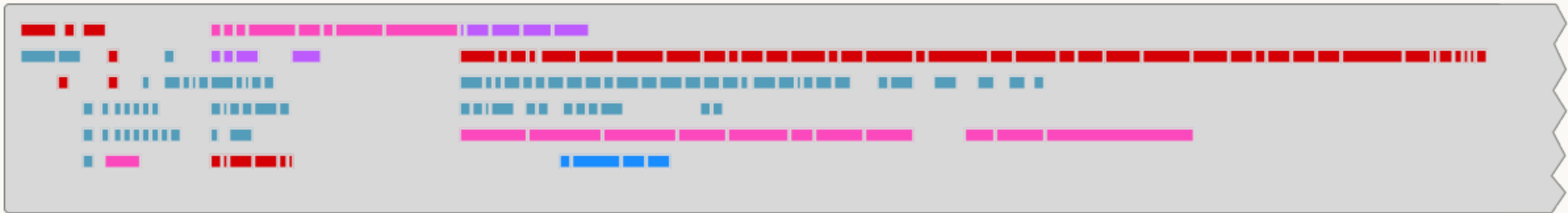
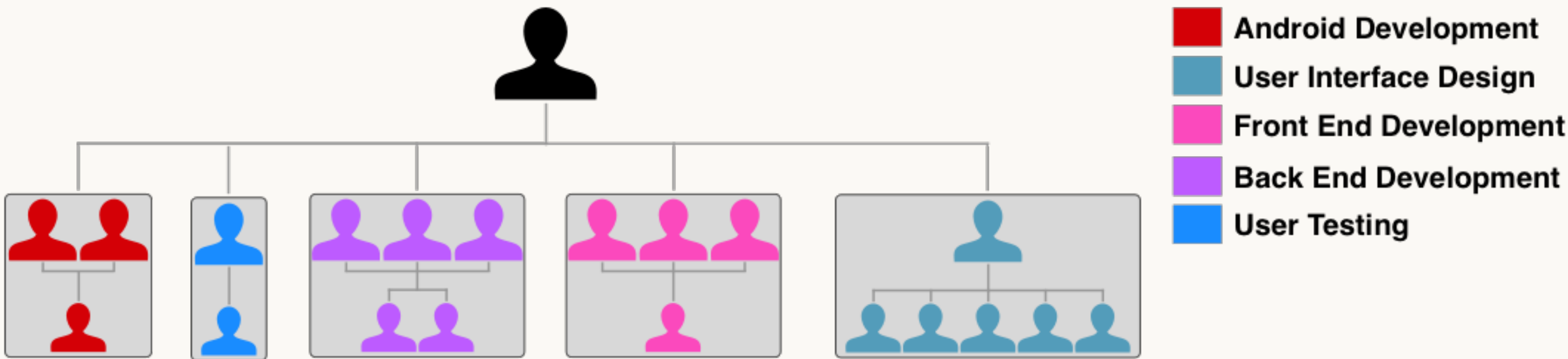
Task timeline

# EMS TRAUMA REPORT

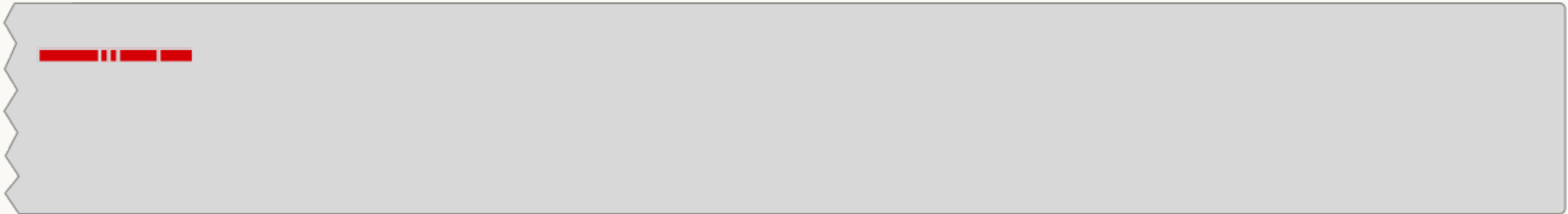


Task timeline

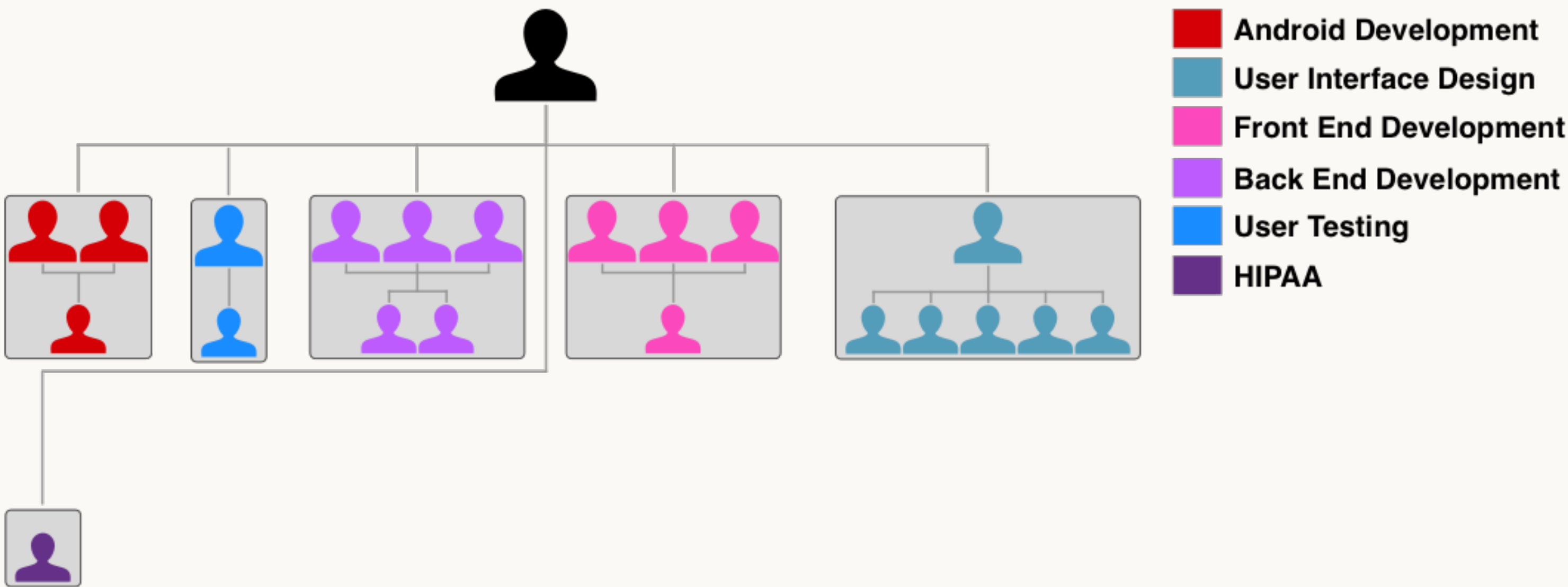
# EMS TRAUMA REPORT



Task timeline



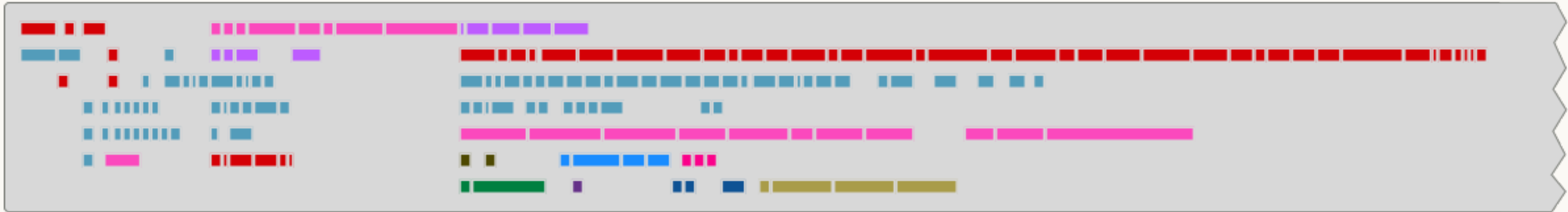
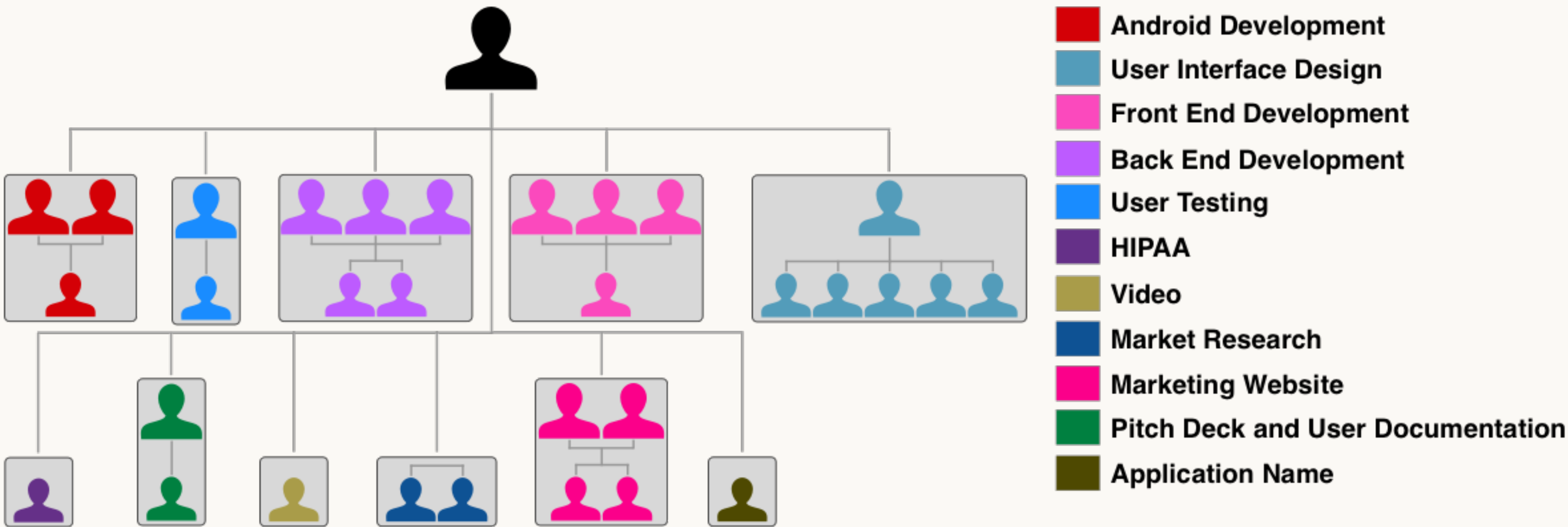
# EMS TRAUMA REPORT



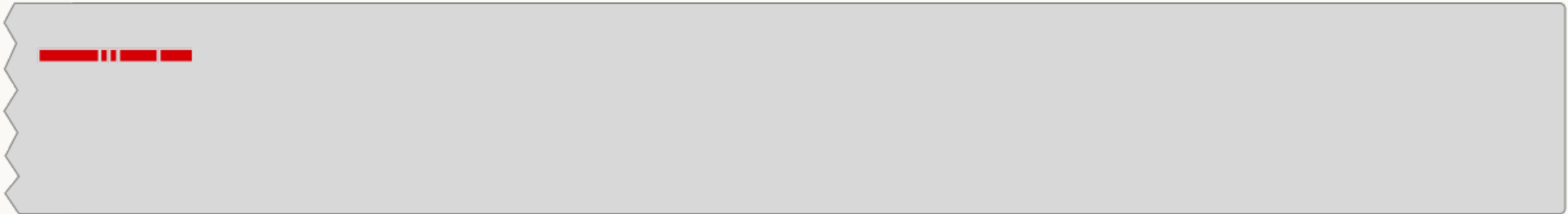
Task timeline



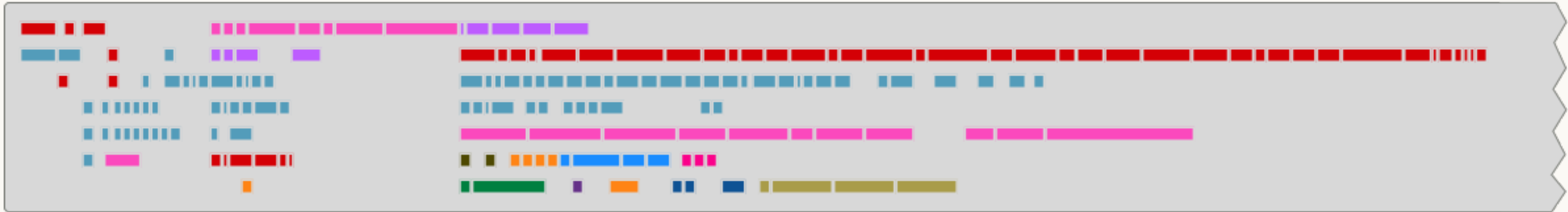
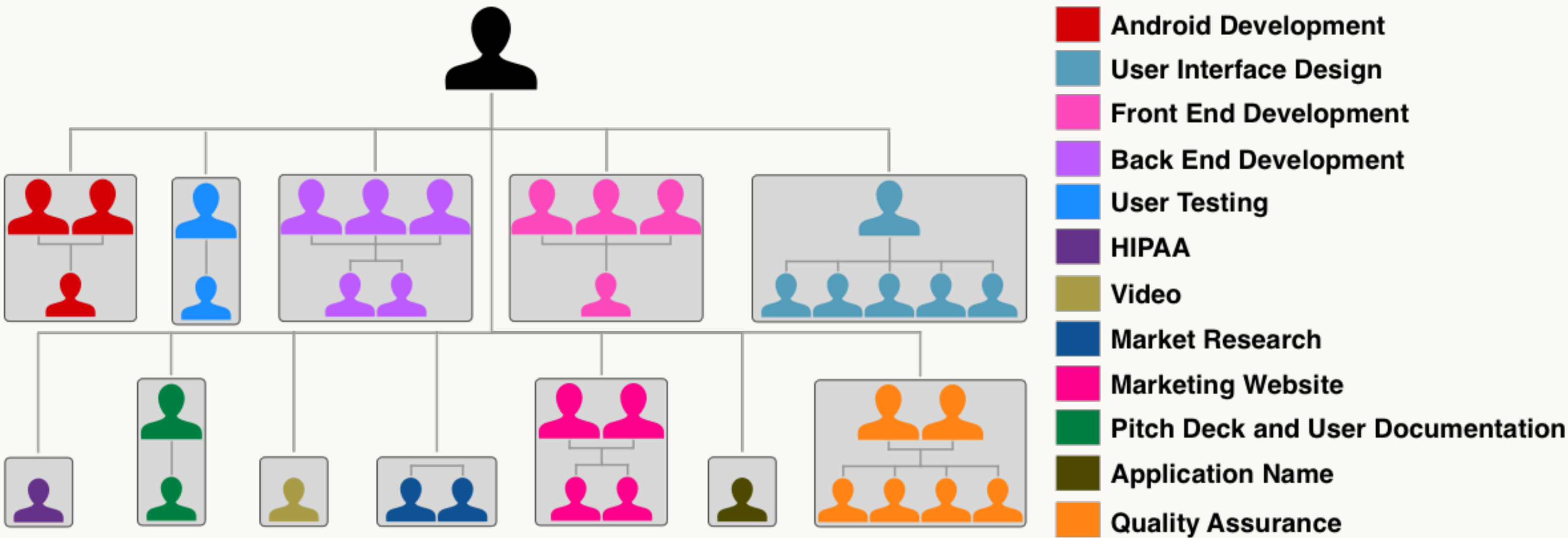
# EMS TRAUMA REPORT



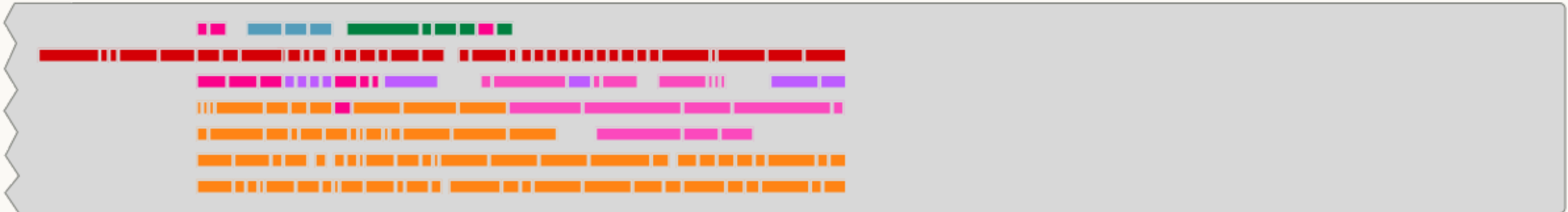
Task timeline



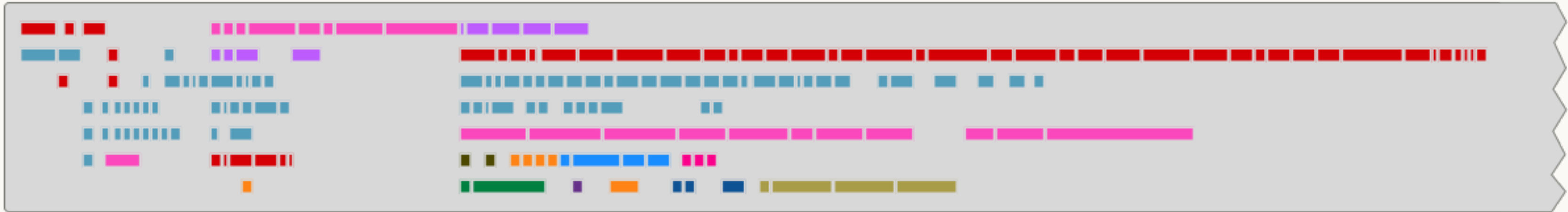
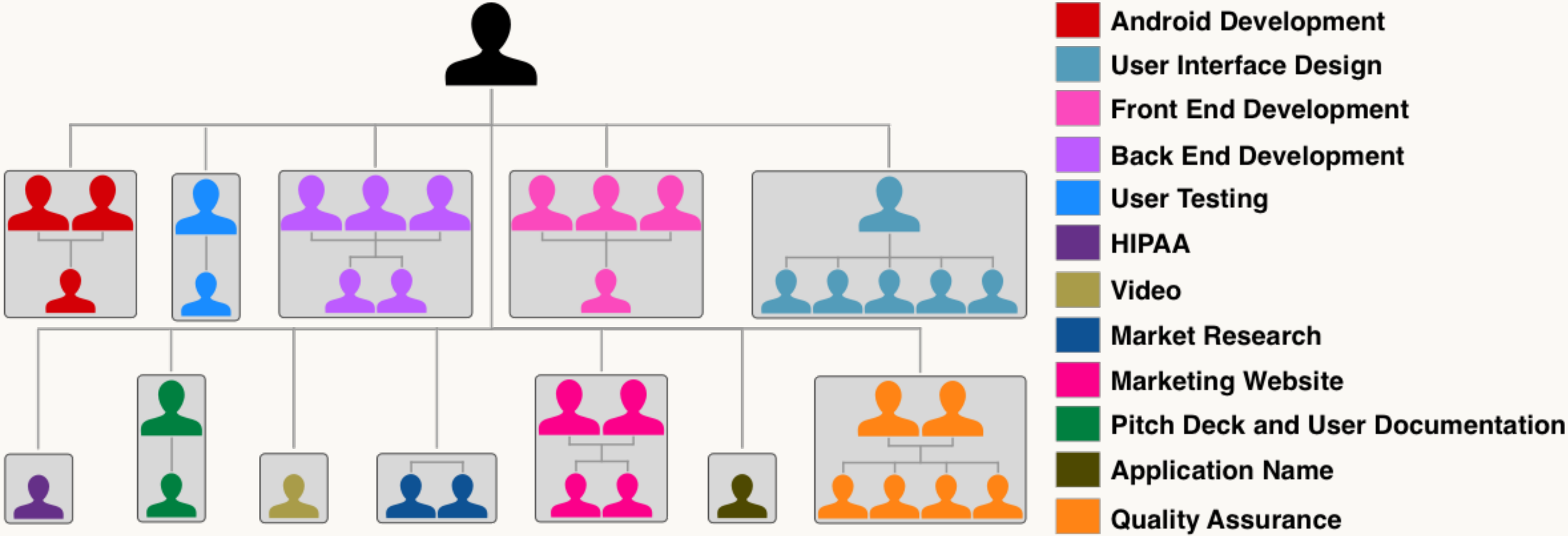
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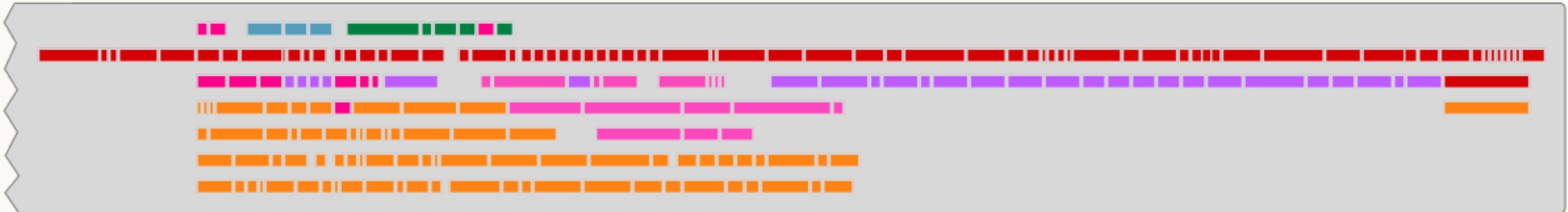
Task timeline



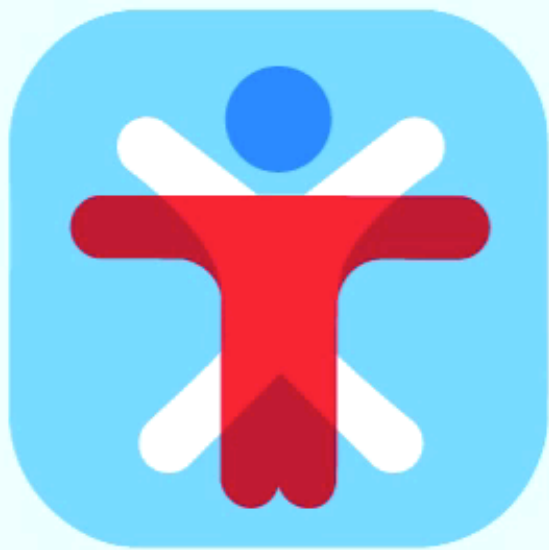
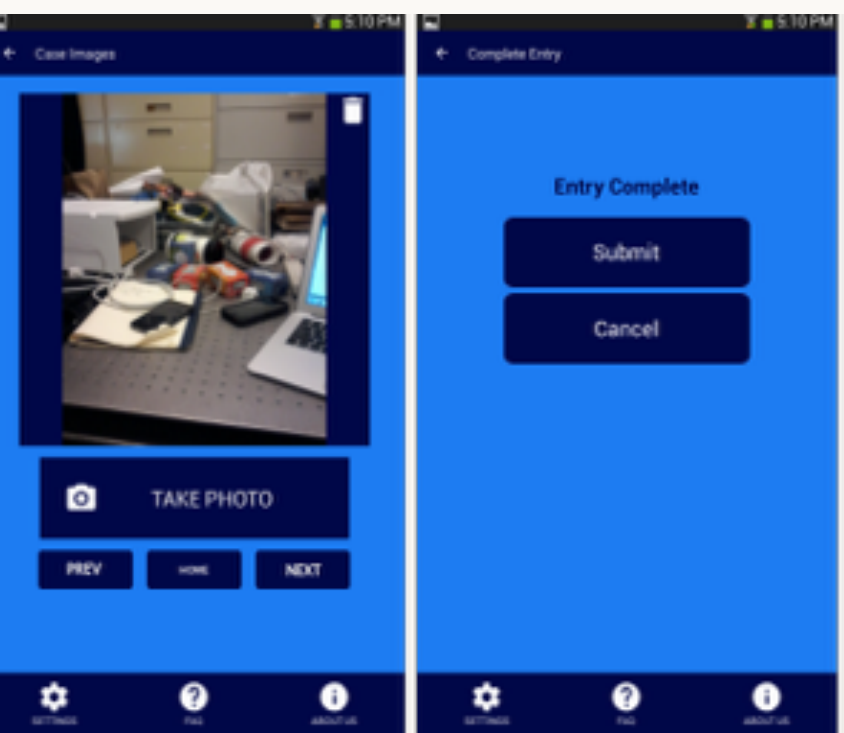
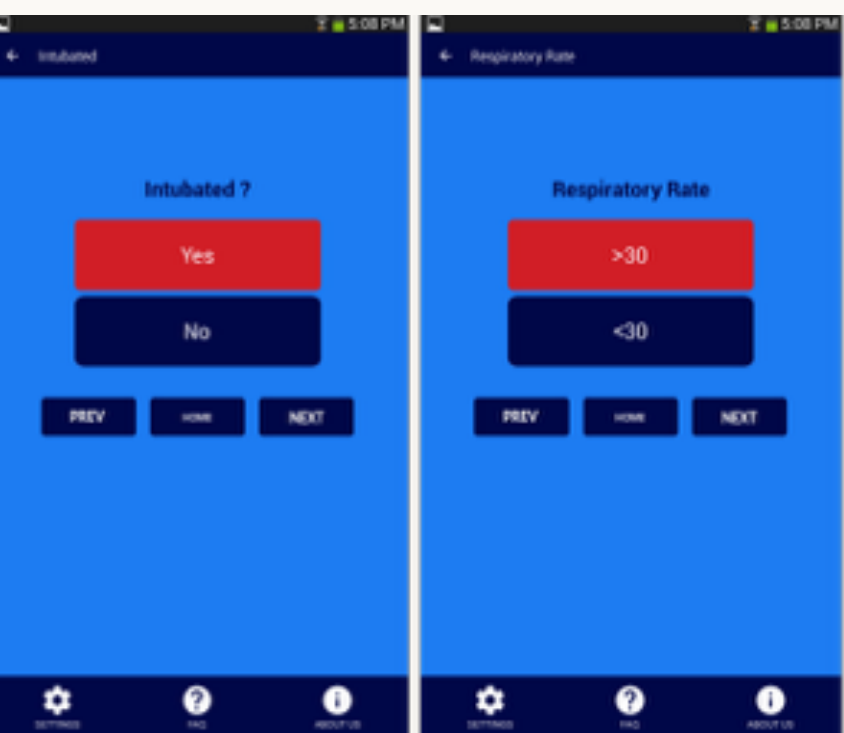
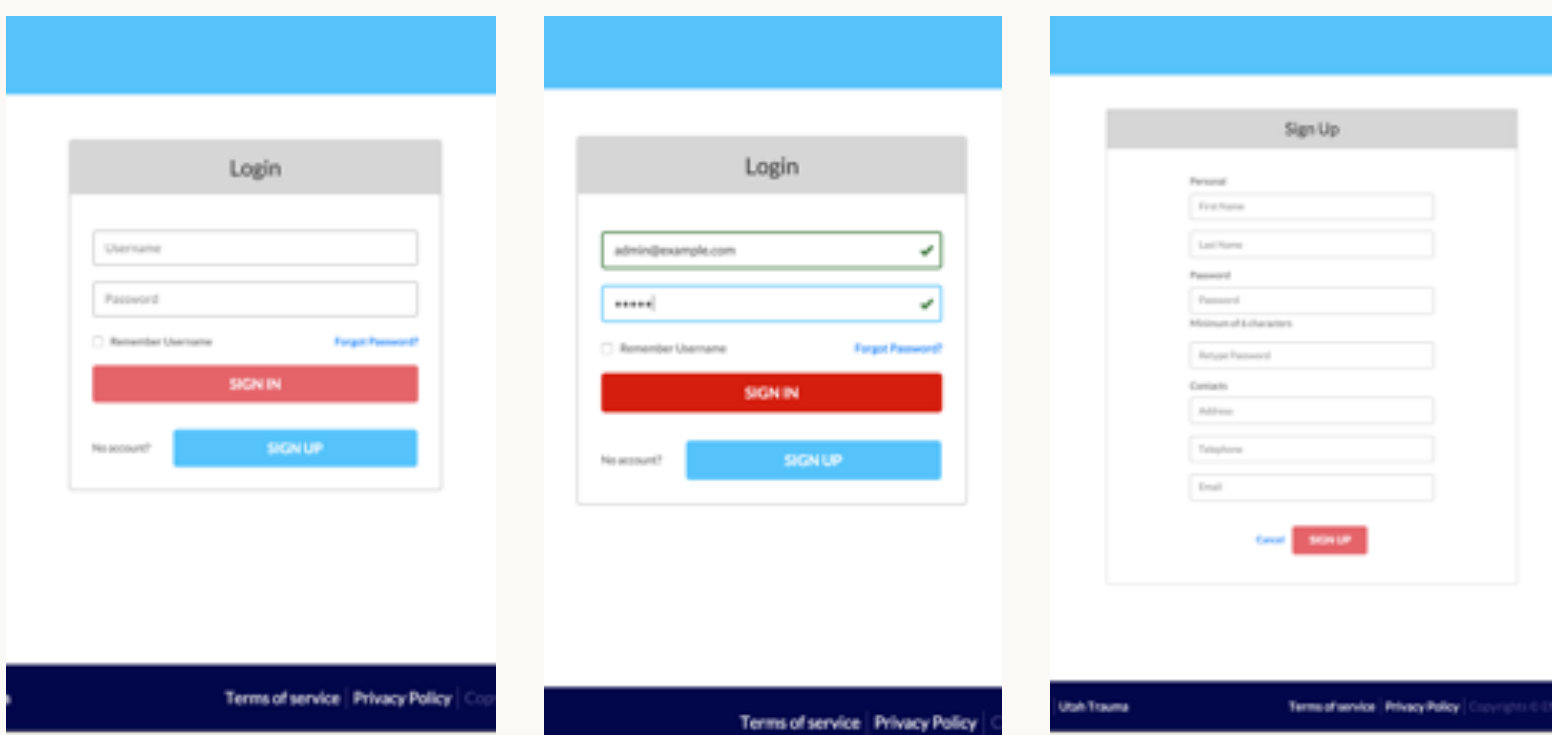
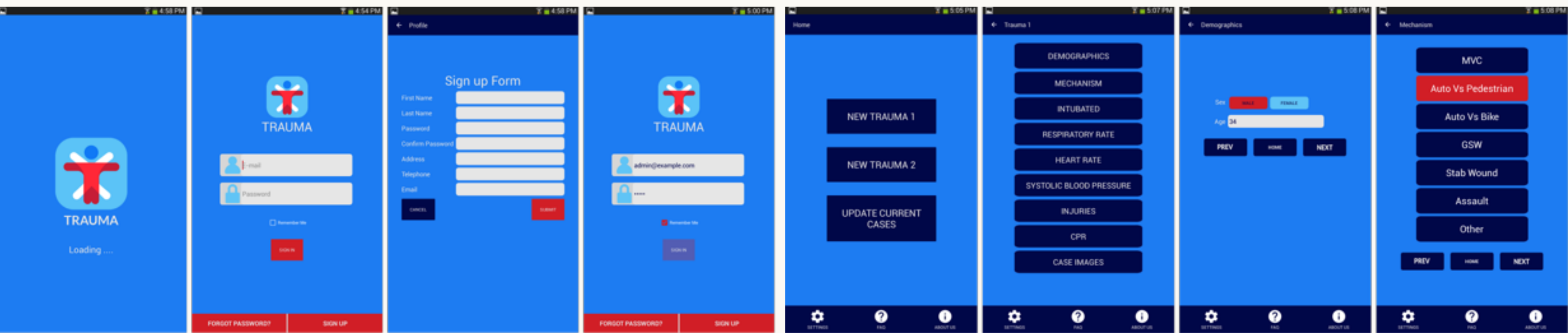
# EMS TRAUMA REPORT



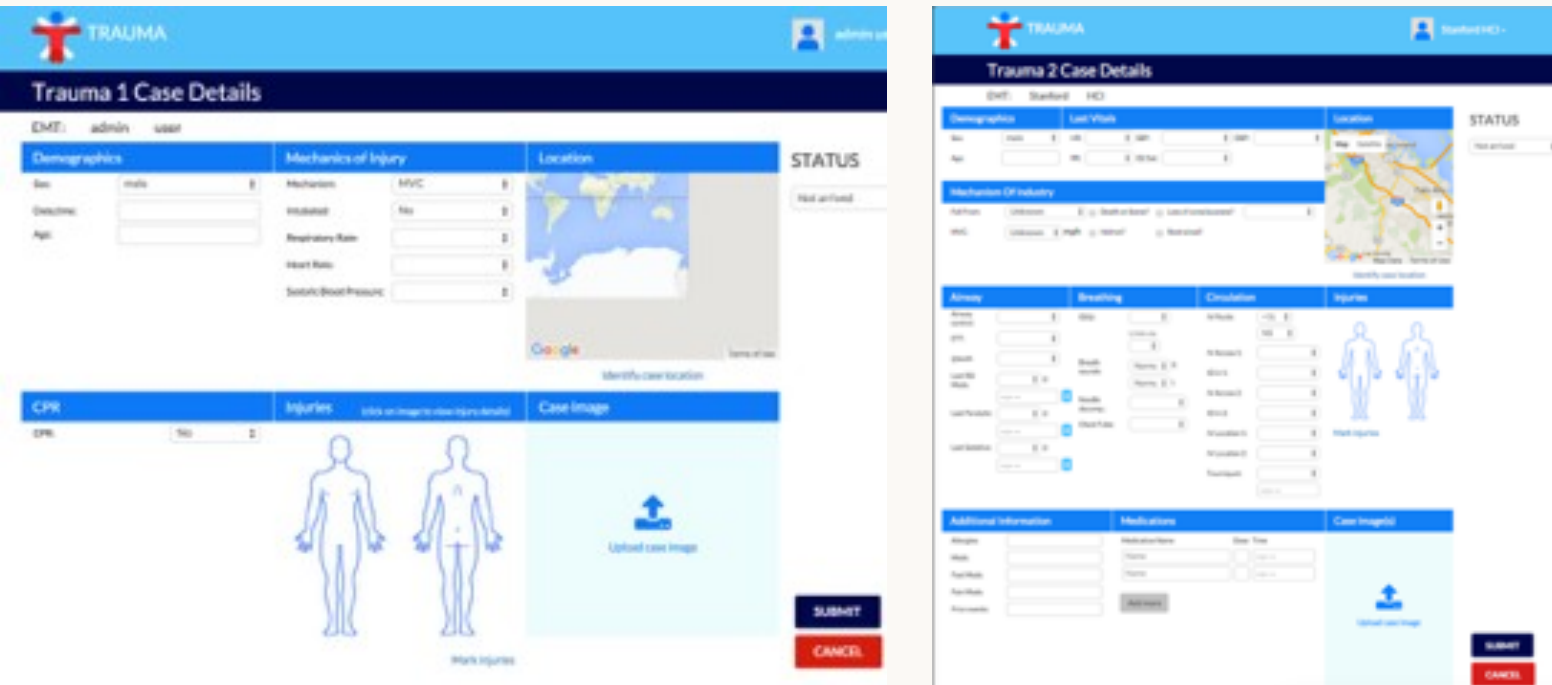
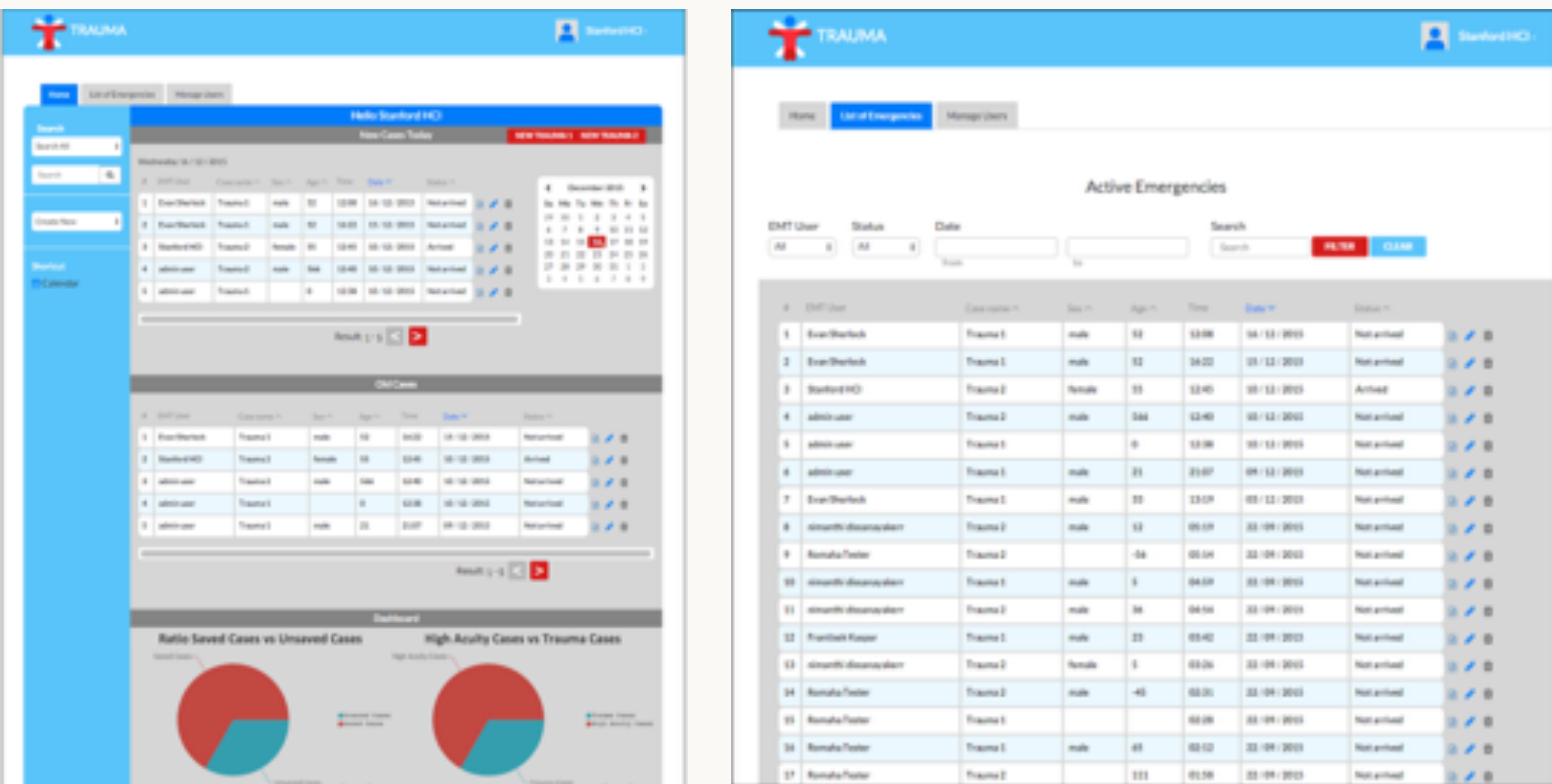
Task timeline



# EMS TRAUMA REPORT



## EMS TRAUMA REPORT







GIVE THE TIMES

Ms. Valentine and Mr. Bernstein wanted to take the concept further. They created a platform, Foundry, in which the process of assembling and running a temporary organization could be automated, without so much as a phone call.



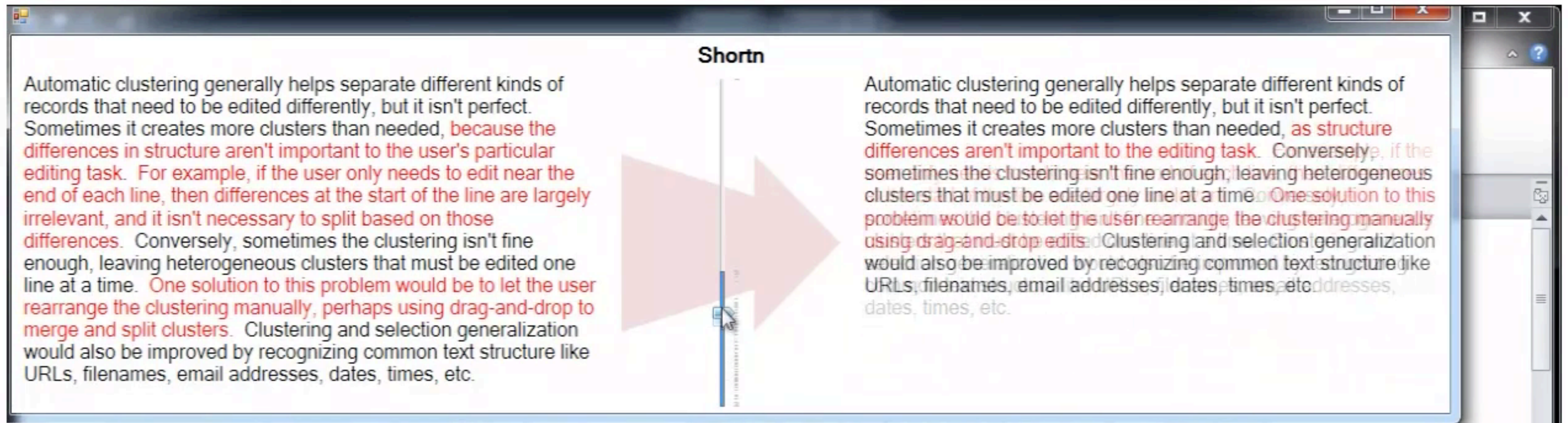
accenture

B12



# EXPERTS IN YOUR APPLICATIONS

## Word processor



WIRED

MIT  
Technology  
Review

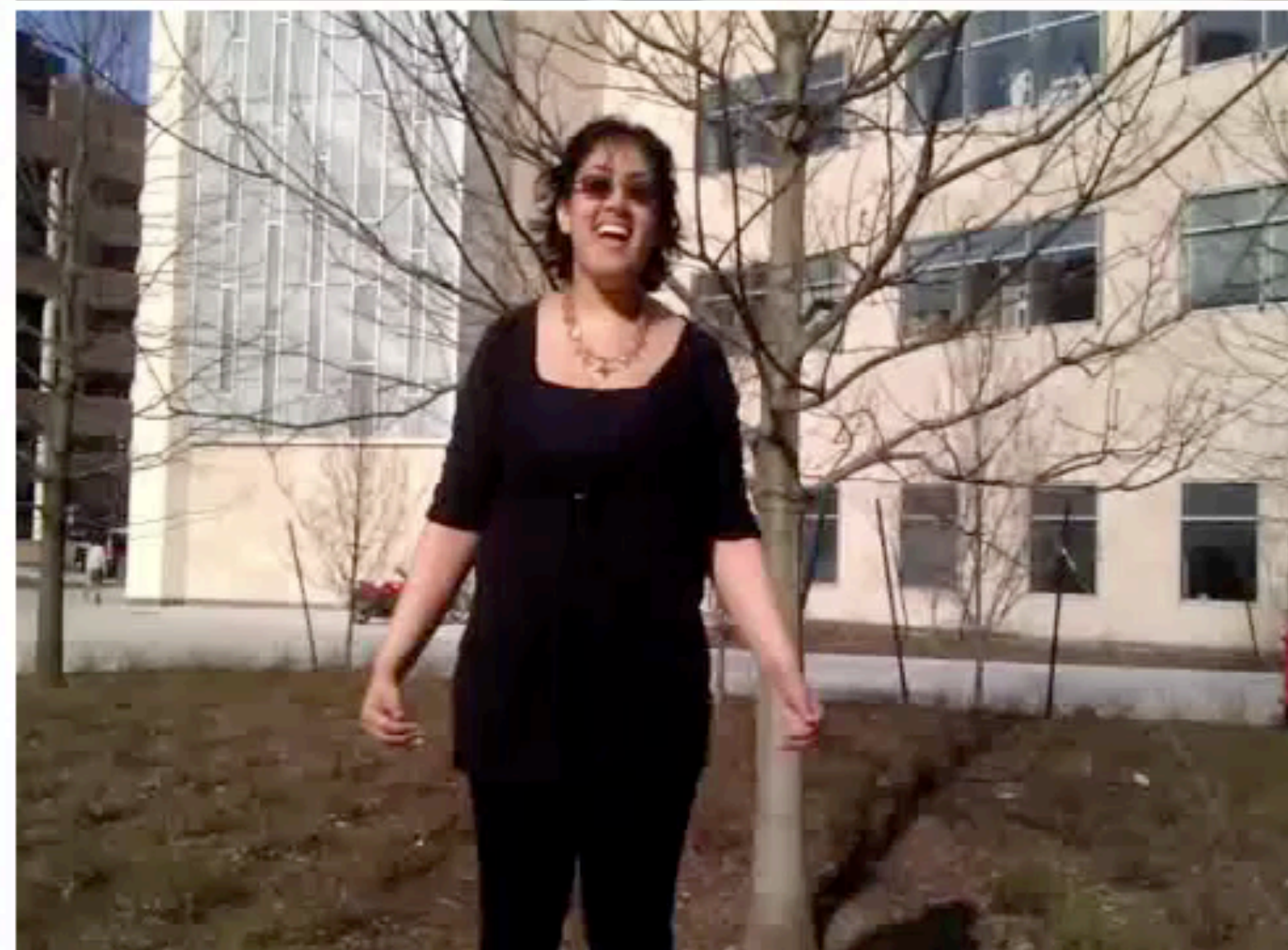
NiemanLab



# EXPERTS IN YOUR APPLICATIONS



Camera





**Computation is powering  
dramatically new forms of  
organization: experts with a  
click**



**But.**

**Would you be happy if your  
own child joined this  
workforce?**

[Kittur et al. 2012]



TECHNOLOGY

## Los Angeles Uber drivers join cities across the U.S. in strike ahead of much-anticipated IPO



Drivers picket in Redondo Beach in protest of Uber's move to enact a 25% wage cut for its drivers on March 25. (Genaro Molina / Los Angeles Times)

By JOHANA BHUIYAN  
STAFF WRITER



## My Frantic Life as a Cab-Dodging, Tip-Chasing Food App Deliveryman



By Andy Newman

July 21, 2019



751

Academic work including:

[Alkhatib et al. 2017]

[Dillahunt 2017]

[Irani and Silberman 2013]

[Gray et al. 2016]

[Hara et al. 2018]

[Martin et al. 2014]

[McInnis et al. 2016]

Stanford CASBS Future of  
Work and Workers Project



# SPARKING THE CONVERSATION

## The Future of Crowd Work

**Aniket Kittur<sup>1</sup>, Jeffrey V. Nickerson<sup>2</sup>, Michael S. Bernstein<sup>3</sup>,  
Elizabeth M. Gerber<sup>4</sup>, Aaron Shaw<sup>4</sup>, John Zimmerman<sup>1</sup>, Matthew Lease<sup>5</sup>, and John J. Horton<sup>6</sup>**

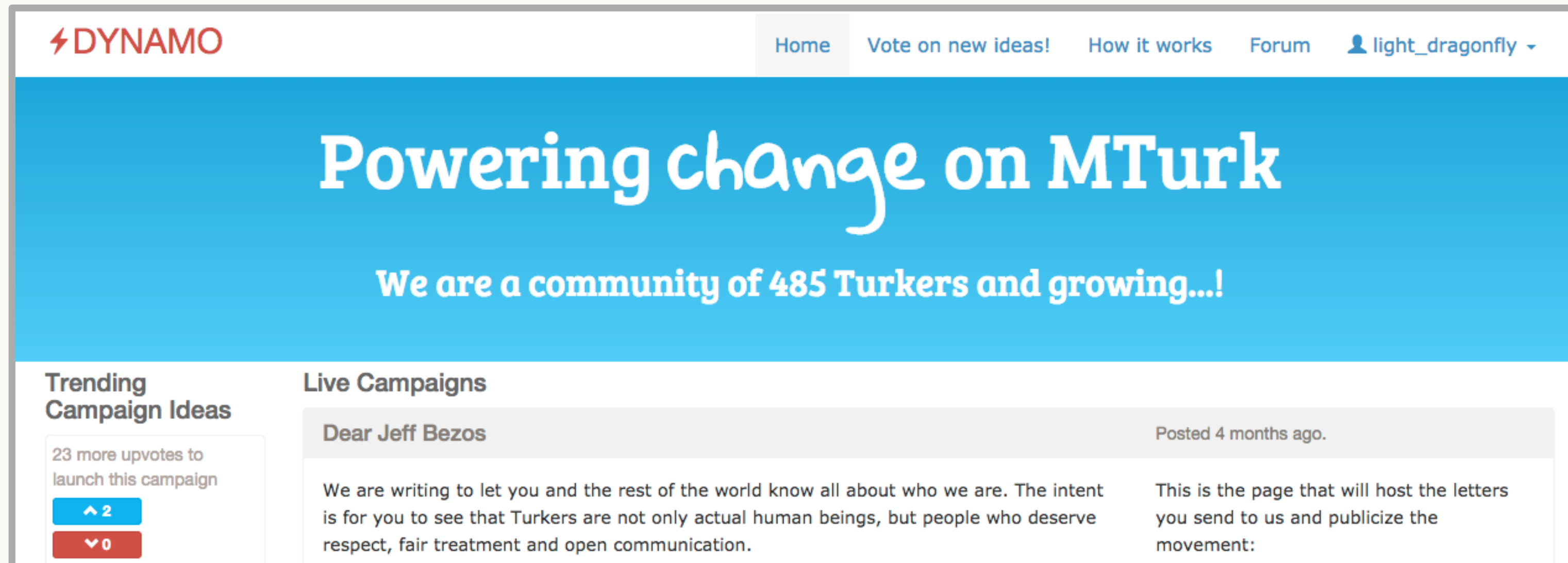
<sup>1</sup>Carnegie Mellon University, <sup>2</sup>Stevens Institute of Technology, <sup>3</sup>Stanford University,  
<sup>4</sup>Northwestern University, <sup>5</sup>University of Texas at Austin, <sup>6</sup>oDesk  
{nkittur, johnz}@cs.cmu.edu, jnickerson@stevens.edu, msb@cs.stanford.edu, {egerber,  
aaronshaw}@northwestern.edu, ml@ischool.utexas.edu, john\_horton@odesk.com

### ABSTRACT

Paid crowd work offers remarkable opportunities for improving productivity, social mobility, and the global economy by engaging a geographically distributed workforce to complete complex tasks on demand and at scale. But it is also possible that crowd work will fail to achieve its potential, focusing on assembly-line piecework. Can we foresee a future crowd workplace in which we would want our children to participate? This paper frames the major challenges that stand in the way of this goal. Drawing on theory from organizational behavior and

to a range of workers and focused support for various task. For example, anyone with access to the Internet can perform *micro*-tasks on the order of seconds using platforms such as Amazon's Mechanical Turk, while more skilled workers can complete multi-hour tasks on professional online marketplaces such as oDesk or work for months to solve R&D challenges on open innovation platforms (e.g. Innocentive). Incentives and work structures also vary tremendously, ranging from crowdsourcing contests awarding prizes to winners (e.g. programming tasks on Topcoder) to micro-labor platforms that pay

# WORKER COLLECTIVE ACTION



The screenshot shows the DYNAMO website. At the top is a navigation bar with the DYNAMO logo and links for Home, Vote on new ideas!, How it works, Forum, and a user profile for light\_dragonfly. Below the navigation bar is a large blue banner with the text "Powering change on MTurk" and "We are a community of 485 Turkers and growing...!". Under the banner, there are two main sections: "Trending Campaign Ideas" and "Live Campaigns". The "Trending Campaign Ideas" section shows a campaign with 23 more upvotes to launch, with up and down vote buttons. The "Live Campaigns" section features a campaign titled "Dear Jeff Bezos" posted 4 months ago, with a description of the intent to let the world know about Turkers and a note about the page hosting letters.

**DYNAMO**

Home Vote on new ideas! How it works Forum light\_dragonfly

## Powering change on MTurk

We are a community of 485 Turkers and growing...!

**Trending Campaign Ideas**

23 more upvotes to launch this campaign

^ 2

v 0

**Live Campaigns**

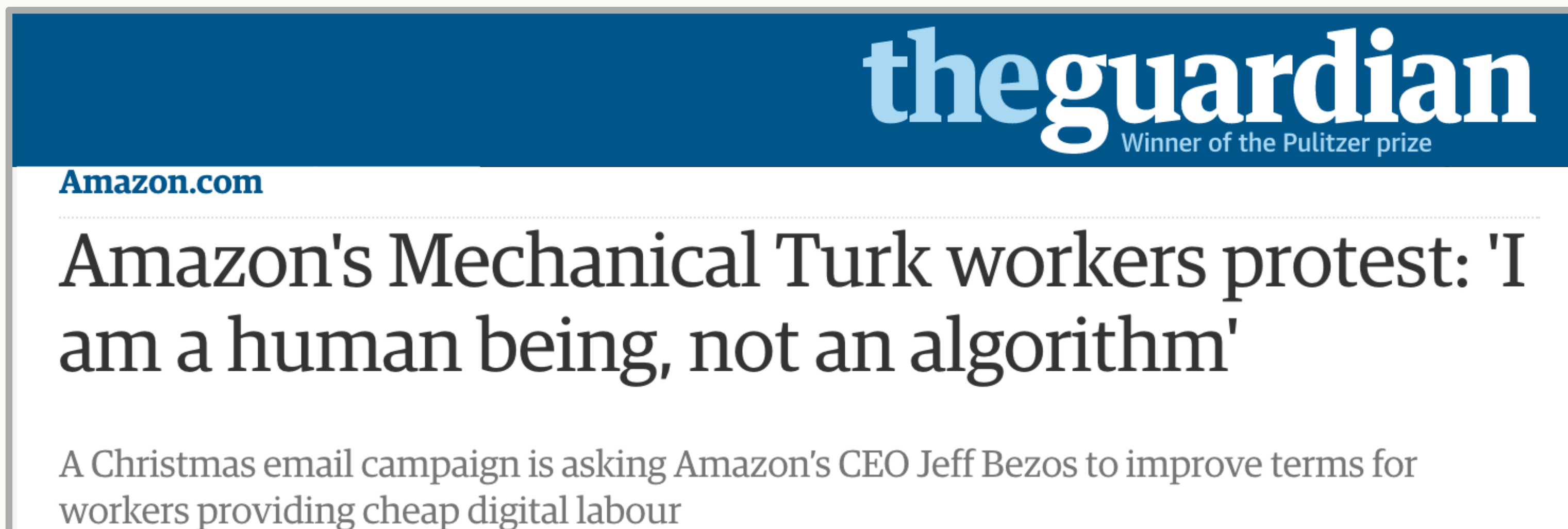
**Dear Jeff Bezos** Posted 4 months ago.

We are writing to let you and the rest of the world know all about who we are. The intent is for you to see that Turkers are not only actual human beings, but people who deserve respect, fair treatment and open communication.

This is the page that will host the letters you send to us and publicize the movement:

We Are Dynamo:  
socio-technical  
infrastructure for  
collective action  
amongst crowd  
workers

[Salehi et al. 2015]



The screenshot shows a Guardian article. The Guardian logo is at the top, with the tagline "Winner of the Pulitzer prize". Below the logo is the URL "Amazon.com". The article title is "Amazon's Mechanical Turk workers protest: 'I am a human being, not an algorithm'". The article text begins with "A Christmas email campaign is asking Amazon's CEO Jeff Bezos to improve terms for workers providing cheap digital labour".

**theguardian**  
Winner of the Pulitzer prize

**Amazon.com**

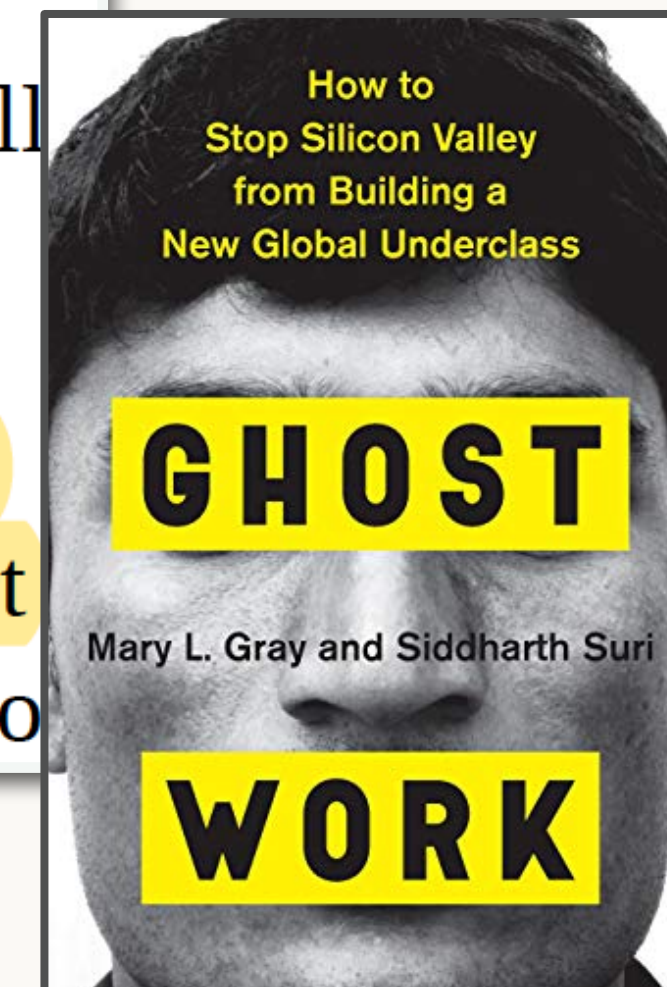
## Amazon's Mechanical Turk workers protest: 'I am a human being, not an algorithm'

A Christmas email campaign is asking Amazon's CEO Jeff Bezos to improve terms for workers providing cheap digital labour

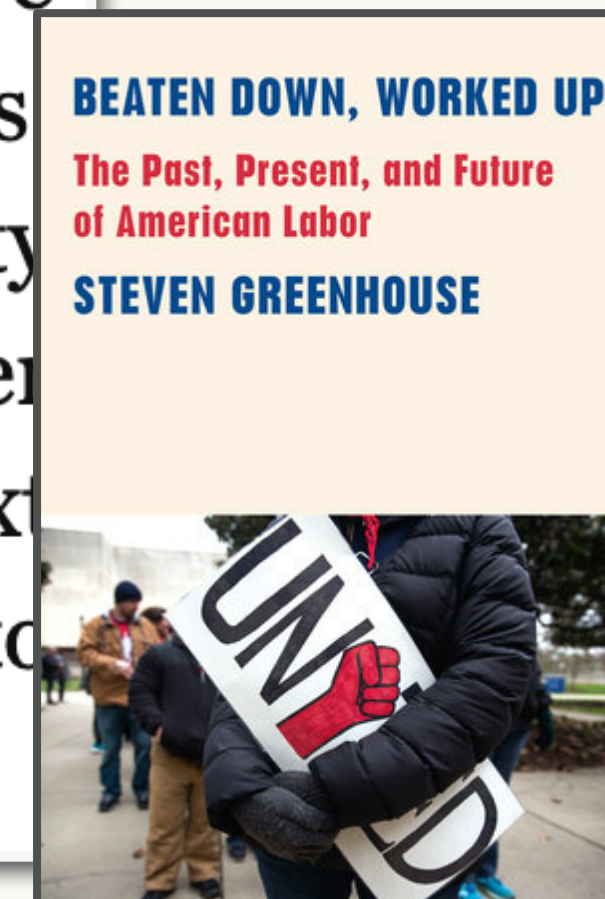


# WORKER COLLECTIVE ACTION

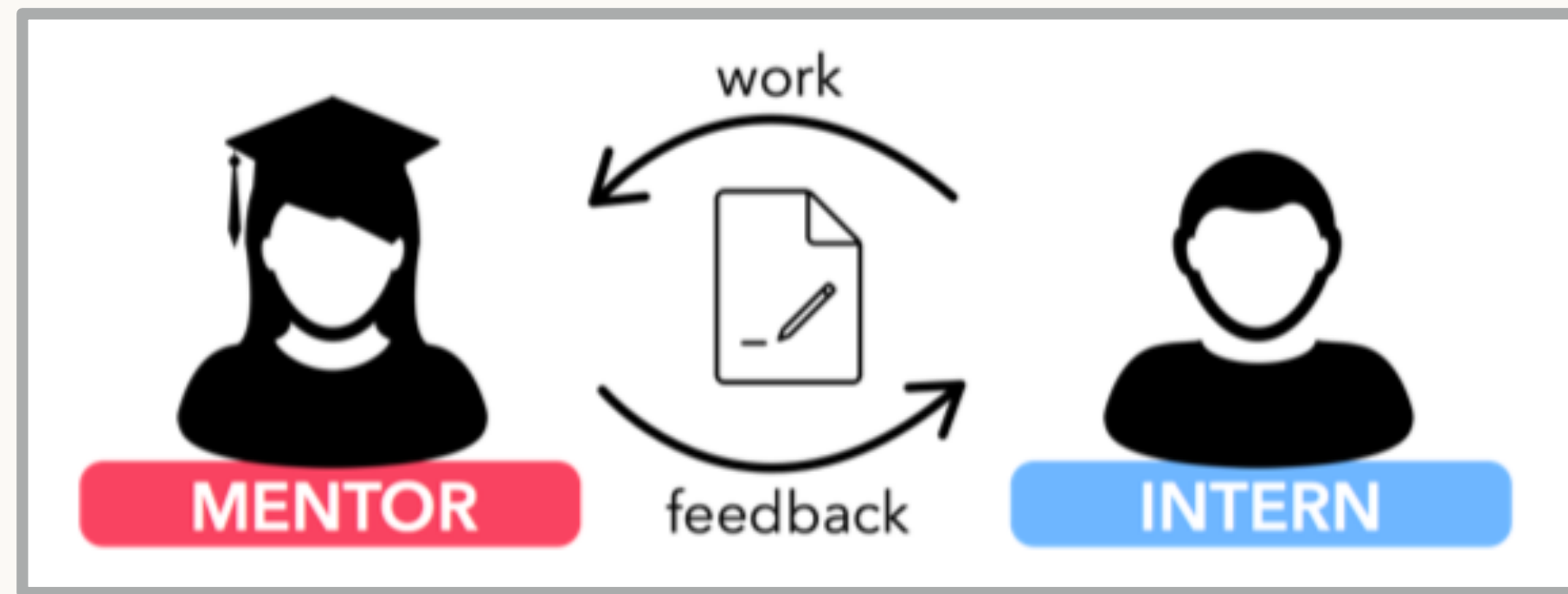
The campaign started in the fall of 2014. Several MTurk discussion forum leaders, working with graduate students and faculty at Stanford and the University of California at San Diego, were already building a virtual union hall of sorts for MTurk's international worker base. The goal was to make it easier for workers to anonymously share stories about their experience and discuss possible actions that they could take. The site, nicknamed "Dynamo," was part of a larger research project meant to explore how to "build systems that support collective action online."<sup>14</sup> One of its most successful actions was the drafting of



their ways. That was followed by Dynamo, which its founders saw as a virtual union hall. "I want to help ordinary workers create a collective voice that has to be heard," said Lilly Irani, one of Dynamo's founders. Another Dynamo founder, Michael Bernstein, a Stanford University professor of computer science, added, "It's easy to come together online, act upset, and blow smoke. We wanted to take it to the next level: What does it take to come together to transform that energy into decisions and the pursuit of common goals?"

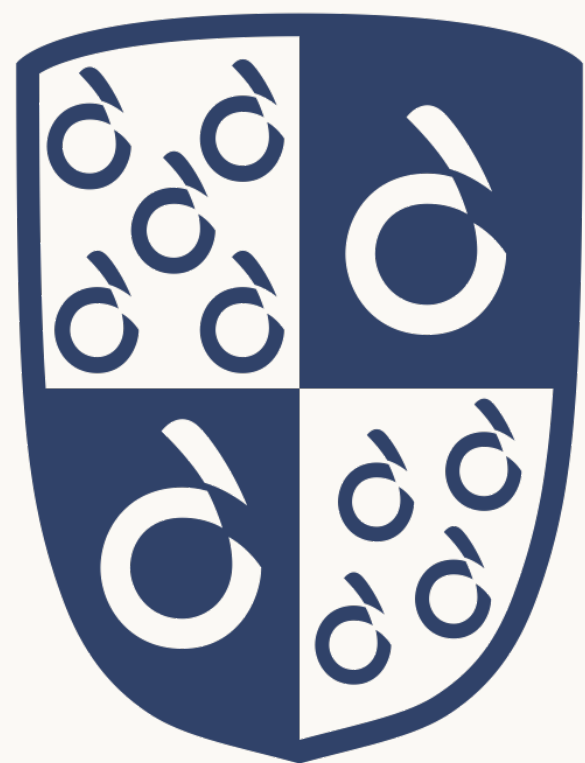


# FUTURES OF ONLINE WORK



Micro-internships

[Suzuki et al. 2016]



Guild-style  
collective  
accreditation

[Whiting et al. 2017]



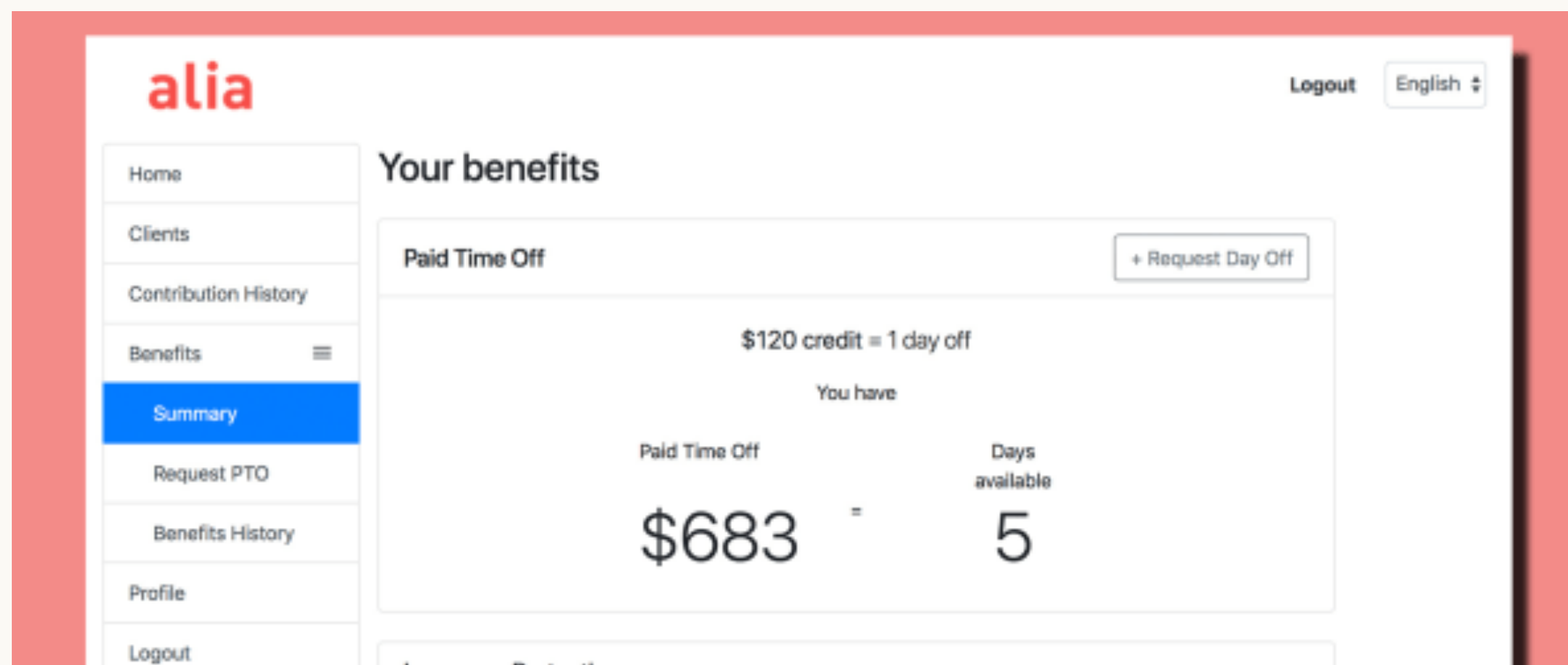
# FUTURES OF ONLINE WORK

## FAIR WORK

Add one line of code, and Fair Work will ensure that your Mechanical Turk workers are paid at least minimum wage. To start, [get the code snippet for your Mechanical Turk account](#).

Tools to ensure  
piecework is paid  
minimum wage

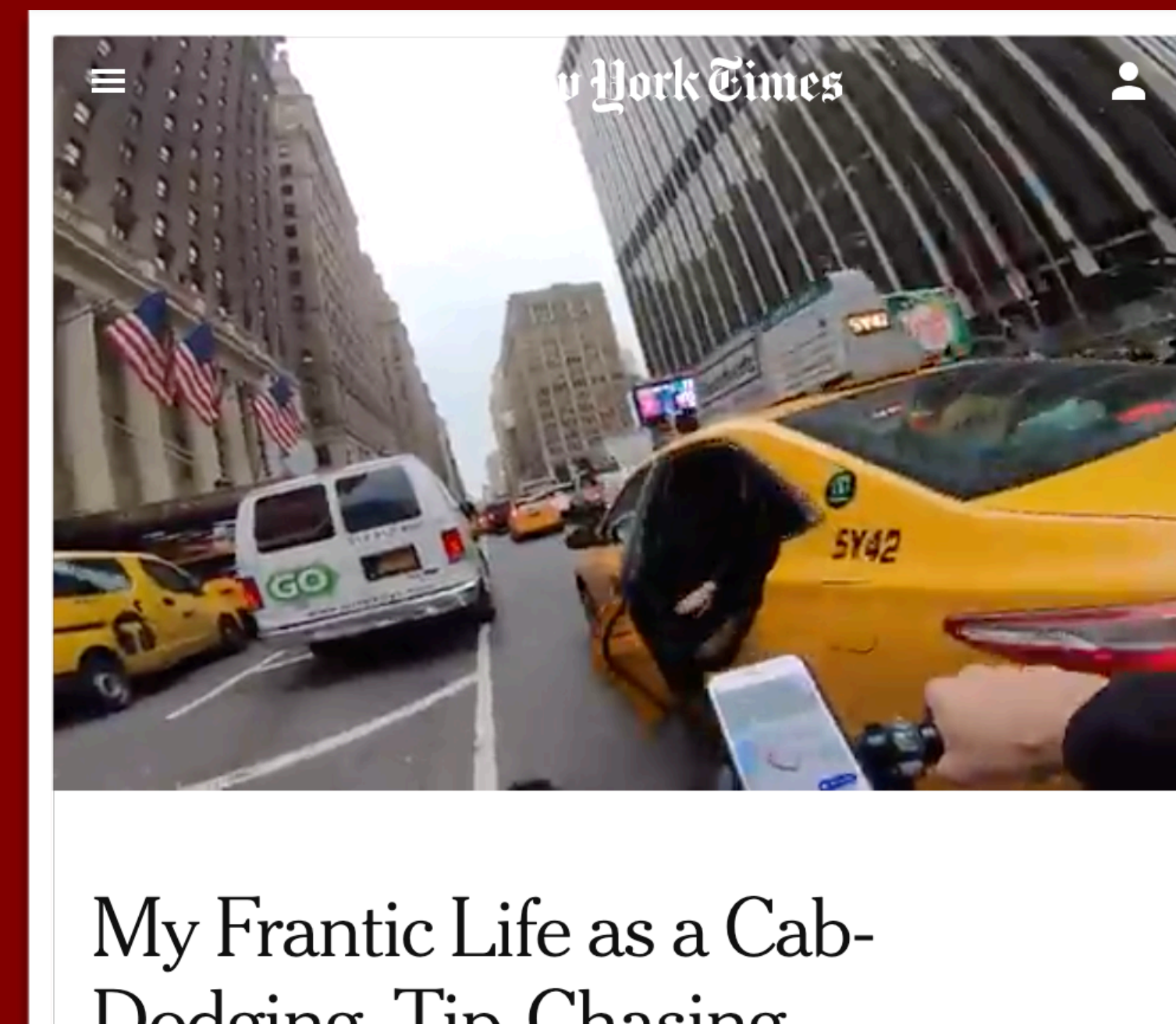
[Whiting, Hugh, Bernstein  
2019]



Portable benefits

[NDWA, early  
collaboration with  
Alkhatib]

# This is simply not enough.





**However, I am increasingly uncomfortable creating this infrastructure unless we improve the future for workers.**

**This environment is both  
hurting people and stifling  
innovation.**

**Policy**



**Future of Work and Workers**



**Code**

# CALIFORNIA AND THE FUTURE

California has a reputation for being on the vanguard of the future of work

Care workers

Justice for Janitors

AB5



**Noam Scheiber**

@noamscheiber



Agree. Key is organizing workers on the platforms. Hollywood is all temp orgs. But unions are strong, wrkers do well

Noam Scheiber, labor and workplace reporter for the New York Times, 7/13/2017

# OUR NEEDS FOR THE FUTURE

Workers need to **feel comfortable taking risks** to join a computationally-mediated future of work.

We need to create opportunities that are **vastly preferred to equivalent traditional work**, instead of platforms that workers turn to when their traditional jobs fall through.

We must recognize that this is not exciting because it's access to cheap labor: it's exciting because it affords the ability for computation to **support collaboration between diverse participants** through networks.

# OPPORTUNITIES

I see incredible opportunities if we can guarantee a positive future for work and workers.

Systems that help us convene the right collaborators

Systems that help us find the right way to collaborate

Systems that empower anyone — entrepreneurs, civil society, volunteer organizations — the ability to convene a group around themselves in minutes.

**If we do nothing, incredible opportunities will be offset by a replay of the piecework of the past.**

**If we create innovative policies, we will be miles ahead of anywhere else on earth.**

Collaborators: Melissa Valentine, Lilly Irani, Daniela Retelny, Rob Miller, David Karger, Mark Ackerman, Joel Brandt, CASBS Project on the Future of Work and Workers Funders: NSF IIS-1351131, Sloan, Accenture ATL, Microsoft, Stanford Cyber Initiative, ONR, Hasso Plattner DTP